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U.S. DEPARTMENT OF AGRICULTURE

FEDERAL - STATE - PRIVATE

COOPERATIVE

# SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF
**APR. 1, 1960**

MSDA SCS LINCOLN, NEBR. 1960

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

## PUBLISHED BY SOIL CONSERVATION SERVICE

| REPORTS | ISSUED | LOCATION | COOPERATING WITH |
|---|---|---|---|
| **RIVER BASINS** | | | |
| COLORADO AND STATE OF UTAH | MONTHLY (JAN.-MAY) | SALT LAKE CITY, UTAH | UTAH STATE ENGINEER AND OTHER AGENCIES |
| COLUMBIA AND STATES OF IDAHO AND ALASKA | MONTHLY (JAN.-MAY) | BOISE, IDAHO | IDAHO STATE RECLAMATION ENGINEER |
| UPPER MISSOURI AND STATE OF MONTANA | MONTHLY (FEB.-MAY) | BOZEMAN, MONTANA | MONT. AGR. EXP. STATION |
| WEST-WIDE | OCT. 1, APR. 1, MAY 1 | PORTLAND, OREGON | ALL COOPERATORS |
| **STATES** | | | |
| ARIZONA | SEMI-MONTHLY (JAN. 15 - APR. 1) | PHOENIX, ARIZONA | SALT R. VALLEY WATER USERS ASSOCIATION<br>ARIZ. AGR. EXP. STATION |
| COLORADO AND NEW MEXICO | MONTHLY (FEB.-MAY) | FORT COLLINS, COLORADO | COLO. AGR. EXP. STATION<br>COLO. STATE ENGINEER<br>N. MEX. STATE ENGINEER |
| NEVADA | MONTHLY (FEB.-APR.) | RENO, NEVADA | NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES |
| OREGON | MONTHLY (JAN.-MAY) | PORTLAND, OREGON | ORE. AGR. EXP. STATION<br>OREGON STATE ENGINEER |
| WASHINGTON | MONTHLY (FEB.-MAY) | SPOKANE, WASHINGTON | WASH. STATE DEPT. OF CONSERVATION |
| WYOMING | MONTHLY (FEB.-JUNE) | CASPER, WYOMING | WYOMING STATE ENGINEER |

*Copies of these various reports may be secured from:* Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

## PUBLISHED BY OTHER AGENCIES

| REPORT | ISSUED | AGENCY |
|---|---|---|
| BRITISH COLUMBIA | MONTHLY (FEB.-JUNE) | COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA |
| CALIFORNIA | MONTHLY (FEB.-MAY) | CALIFORNIA DEPT. OF WATER RESOURCES, SACRAMENTO, CALIFORNIA |

# FEDERAL-STATE-PRIVATE COOPERATIVE

# SNOW SURVEYS and WATER SUPPLY FORECASTS

# for

# MONTANA AND NORTHERN WYOMING

# (Upper Missouri and Upper Columbia River Basins)


Report Prepared By:

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Soil Conservation Service



U. S. Department of Agriculture
Soil Conservation Service
and
Montana Agricultural Experiment Station
Bozeman, Montana



Report Issued By:

H. D. Hurd
State Conservationist
of Montana

O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

R. E. Huffman
Director
Montana Agricultural
Experiment Station

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| LIST OF COOPERATORS | Inside Back Cover |

MONTANA WATER SUPPLY OUTLOOK
as of
April 1, 1960

Statewide, the 1960 Water Supply Outlook for Montana is only FAIR. Exceptionally warm weather during the last two weeks of March removed most of the low elevation snow. This warm spell ripened the high elevation snow-pack for an early spring runoff. A cool May could retard the runoff to some extent.

High base flow in the streams during the winter and an above normal fall precipitation raised the forecasts that would otherwise be much lower.

Soil moisture throughout the State is exceptionally high for April first.

The Jefferson River is forecast at 91 percent average, with most of the water to come from the Big Hole River. The Madison River is forecast at 71 percent average and the Gallatin River is forecast at 74 percent average. Combined, these major streams will make close to 80 percent average flow down the Missouri River.

The Columbia River basin in Montana is covered with only a FAIR snow-pack--75 percent average. The South Fork of the Flathead River, below Hungry Horse Dam, is forecast at 79 percent average. The Flathead River at Columbia Falls is forecast to flow 1,819,000 acre feet during the April-September period, or 79 percent average. This is 40 percent LESS than last year. The Clark Fork River at Whitehorse Rapids, near Cabinet, is forecast to flow 10,676,000 acre feet of water during the April-September period. This figure is 77 percent average.

# UPPER MISSOURI RIVER BASIN
# SNOW SURVEY COURSES
# IN
# MONTANA & NORTHERN WYOMING

LEGEND
- TOWNS AND CITIES
- 1304 SNOW SURVEY COURSE
- 9GI IDAHO & WYOMING NUMBERS
- STREAM GAGING STATIONS

1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN MONTANA

SCALE IN MILES 60 30 0 60 100

I KOOTENAI
II FLATHEAD
III CLARK FORK
IV BLACKFOOT
V BITTERROOT
VI MARIAS
VII SUN
VIII BEAVERHEAD
IX MADISON
X UPPER MISSOURI
XI UPPER YELLOWSTONE

ST MARY
MILK
GALLATIN
JEFFERSON
RUBY
CLARK FORK (YELLOWSTONE RIVER)
RED LODGE
MUSSELSHELL
LOWER YELLOWSTONE
SHOSHONE
GREYBULL
BIG HORN
NOWOOD
POPO AGIE
TONGUE
POWDER
SHELL

IDAHO
MONTANA
WYOMING

# INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. | Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|---|
| JEFFERSON RIVER | | | MISSOURI RIVER DRAINAGE | | | | | | |
| (ROCK-WATERHEAD) | | | | | | | | | |
| Lakeview Ridge | 11E3 | 7600 | 27 | 1S | 2W | 1948 | | 3,4,5 | 10 |
| Lakeview Canyon | 11E4 | 6930 | 26 | 1S | 2W | 1948 | | 3,4,5 | 10 |
| Limekiln | 12E2 | 6950 | 5 | 1S | 3W | 1948 | | 3,4 | 1 |
| White Pine Ridge | 12E1 | 8850 | 18 | 1S | 3W | 1948 | | 3,4 | 1 |
| (HORSE PRAIRIE) | | | | | | | | | |
| Bloody Dick | 13D10 | 7600 | 12 | 6S | 16W | 1948 | | 3,4 | 1 |
| Cold Storm | 13D9 | 8100 | 11 | 8S | 16W | 1948 | | 3,4 | 1 |
| Lemhi Pass | 13E1 | 7480 | 9 | 10S | 15W | 1948 | | 3,4 | 1 |
| Terrell Creek | 13D12 | 6850 | 14 | 9S | 15W | 1948 | | 3,4 | 1 |
| Trail Creek | 13E2 | 7090 | 15 | 10S | 15W | 1948 | | 3,4 | 1 |
| Selway Junction | 13D11 | 6800 | 27 | 8S | 15W | 1948 | | 3,4 | 1 |
| (BIG HOLE) | | | | | | | | | |
| Big Hole Pass | 13D3 | 7240 | 28 | 3S | 18W | 1948 | | 3,4 | 1 |
| Big Hole Pass-Be. | 13D4 | 6900 | 24 | 3S | 18W | 1948 | | 3,4 | 1 |
| East Boundary | 13D5 | 6700 | 22 | 3S | 17W | 1948 | | 3,4 | 1 |
| Gibbons Pass | 13D2 | 7100 | 4 | 2S | 19W | 1934 | | 1,2,3,4,5 | 1,3 |
| Jahnke Creek | 13D8 | 7340 | 25 | 7S | 16W | 1948 | | 3,4 | 1 |
| Miner Forks | 13D6 | 7300 | 24 | 6S | 17W | 1948 | | 3,4 | 1 |
| Miner Lake | 13D7 | 6720 | 10 | 6S | 16W | 1945 | | 3,4,5 | 1 |
| (WISE RIVER) | | | | | | | | | |
| Anderson Mdw. | 13D14 | 7000 | 18 | 3S | 12W | 1948 | | 3,4 | 1 |
| Elk Horn | 13D15 | 8150 | 15 | 4S | 12W | 1935 | | 3,4,5 | 3 |
| Wise River | 13D13 | 6300 | 15 | 2S | 12W | 1948 | | 3,4 | 1 |
| (JUDY RIVER) | | | | | | | | | |
| Flashlight | 12D3 | 6950 | 22 | 8S | 7W | 1945 | | 3,4,5 | 1 |
| MADISON RIVER | | | | | | | | | |
| Hebgen | 11E5 | 6850 | 22 | 11S | 3E | 1934 | | 1,2,3,4,5 | 3 |
| West Yellowstone | 11E7 | 6700 | 34 | 13S | 5E | 1934 | | 1,2,3,4,5 | 3 |
| Norris Basin | 10E2 | 7500 | 44°44' | | 110°42' | 1936 | | 3,4 | 6 |
| GALLATIN RIVER | | | | | | | | | |
| Devil's Slide | 10D4 | 8100 | 14 | 5S | 6E | 1935 | | 2,3,4,5 | 2,1 |
| Hood Meadow | 10D3 | 6600 | 22 | 4S | 6E | 1935 | | 2,3,4,5 | 2,1 |
| New World | 10D1 | 6700 | 24 | 3S | 6E | 1939 | | 1,2,3,4,5 | 7 |
| 21-Mile | 11E6 | 7150 | 1 | 11S | 5E | 1934 | | 1,2,3,4,5 | 3 |
| MISSOURI RIVER MAIN STEM | | | | | | | | | |
| Cheesman Reservoir | 12C5 | 6200 | 2 | 8N | 5W | 1936 | | 1,2,3,4,5 | 3 |
| Crystal Lake | 9C1 | 6100 | 19 | 12N | 18E | 1941 | | 3,4 | 1,2 |
| Grasshopper | 10C2 | 7000 | 19 | 9N | 8E | 1938 | | 3,4 | 2 |
| Kings Hill | 10C1 | 7950 | 35 | 13N | 7E | 1934 | | 3,4,5 | 3 |
| Picnic Grounds | 12C6 | 6500 | 10 | 5N | 6W | 1941 | | 2,3,4 | 4 |
| Pipestone Pass | 12C1 | 7200 | 10 | 1N | 7W | 1938 | | 2,3,4,5 | 1 |
| Steeple Pass | 12C1 | 6900 | 16 | 13N | 7W | 1934 | | 3,4,5 | 3 |
| Ten Mile Creek L | 12C2 | 6250 | 13 | 8N | 6W | 1935 | | 1,2,3,4,5 | 3 |
| Ten Mile Creek M | 12C3 | 6800 | 13 | 8N | 6W | 1934 | | 1,2,3,4,5 | 3 |
| Ten Mile Creek U | 12C4 | 8000 | 19 | 8N | 5W | 1935 | | 1,2,3,4,5 | 3 |
| (TETON RIVER) | | | | | | | | | |
| Freight Creek | 12A1 | 6000 | 13 | 26N | 10W | 1948 | | 3,4 | 1 |
| Waldron Creek | 12B2 | 5600 | 16 | 25N | 9W | 1948 | | 3,4 | 1 |
| West Fork | 12B1 | 6000 | 6 | 25N | 9W | 1948 | | 3,4 | 1 |
| (SUN RIVER) | | | | | | | | | |
| Benchmark | 12B8 | 5500 | 9 | 20N | 10W | 1948 | | 3,4 | 1 |
| Cabin Creek | 12B6 | 5400 | 33 | 23N | 10W | 1949 | | 3,4 | 1,2 |
| S-Bull | 12B9 | 5600 | 36 | 20N | 10W | 1948 | | 3,4 | 1,2 |
| Gates Park | 12B5 | 5300 | 31 | 24N | 10W | 1949 | | 3,4 | 1,2 |
| Goat Mountain | 12B7 | 7000 | 20 | 22N | 10W | 1934 | | 3,4 | 3 |
| Wrong Ridge | 12B3 | 6800 | 17 | 25N | 10W | 1949 | | 3,4 | 1,2 |
| Wrong Creek | 12B4 | 5700 | 32 | 25N | 10W | 1949 | | 3,4 | 1,2 |
| (MARIAS RIVER) | | | | | | | | | |
| Marias Pass | 13A5M | 5250 | 34 | 30N | 14W | 1934 | | 1,2,3,4,5 | 3 |
| (MILK RIVER) | | | | | | | | | |
| Rocky Boy | 9A1 | 5200 | 15 | 28N | 16E | 1941 | | 3,4 | 7 |
| (MUSSELSHELL RIVER) | | | | | | | | | |
| Grasshopper | 10C2 | 7000 | 19 | 9N | 8E | 1938 | | 3,4 | 2 |

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. | Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|---|
| MISSOURI RIVER DRAINAGE (cont.) | | | | | | | | | |
| (UPPER YELLOWSTONE) | | | | | | | | | |
| Camp Senia | 9D1 | 7890 | 2 | | 8S | 18E | 1937 | 4 | 1 |
| Canyon | 10E3 | 7750 | 44°-44' | | | 110°-30' | 1938 | 1,2,3,4,5 | 6 |
| Cooke City | 10D7 | 7400 | 25 | | 9S | 14E | 1937 | 1,2,3,4,5 | 6 |
| Crevice Mt. | 10D5 | 8400 | 22 | | 9S | 9E | 1935 | 3,4 | 2 |
| Independence | 10D6 | 8000 | 22 | | 7S | 12E | 1940 | 3,4 | 1 |
| Lake Camp | 10E4 | 7850 | 44°-34' | | | 110°-24' | 1936 | 1,2,3,4,5 | 6 |
| Lupine Creek | 10E1 | 7300 | 44°-54' | | | 110°-37' | 1938 | 1,2,3,4,5 | 6 |
| Lodgepole | 9E1 | 8200 | 32 | | 5SN | 106W | 1940 | 2,3,4,5 | 1,4 |
| West Rosebud | 9D2 | 7500 | 10 | | 7S | 16E | 1940 | 1,2,3,4,5 | 4 |
| (SHIELDS RIVER) | | | | | | | | | |
| Porcupine | 10C3 | 6500 | 10 | | 4N | 10E | 1938 | 3,4 | 1 |
| LOWER YELLOWSTONE | | | | | | | | | |
| (WIND RIVER) Wyoming | | | | | | | | | |
| Big Warm | 9F12 | 8800 | 36 | | 42N | 109W | 1955 | 2,3,4,5 | 1 |
| Brooks Lake #3 | 10F8 | 9200 | 23 | | 44N | 110W | 1939 | 2,3,4,5 | 1 |
| Burroughs Creek | 9F4 | 8800 | 15 | | 43N | 107W | 1948 | 2,3,4,5 | 1 |
| Dinwoodie | 9F10 | 10000 | 21 | | 39N | 105W | 1948 | 2,3,4,5 | 1 |
| Dry Creek | 9F9 | 9500 | 34 | | 4N | 6W | 1948 | 2,3,4,5 | 1 |
| DuNoir | 9F6 | 8750 | 27 | | 42N | 108W | 1940 | 2,3,4,5 | 1 |
| East Fork | 9F13 | 9200 | 23 | | 44N | 104W | 1956 | 2,3,4,5 | 1 |
| Geyser Creek | 9F7 | 8500 | 12 | | 41N | 108W | 1948 | 2,3,4,5 | 1 |
| Little Warm | 9F8 | 9500 | 24 | | 41N | 108W | 1948 | 2,3,4,5 | 1 |
| Sheridan R.S. #1 | 9F5 | 7500 | 3 | | 42N | 109W | 1939 | 2,3,4,5 | 1 |
| Sheridan R.S. #2 | 9F14 | 7500 | 3 | | 42N | 109W | 1955 | 2,3,4,5 | 1 |
| T-Cross Ranch | 9F3 | 8000 | 1 | | 43N | 107W | 1940 | 2,3,4,5 | 1 |
| Togwotee Pass | 10F9 | 9600 | 29 | | 44N | 110W | 1936 | 2,3,4,5 | 11 |
| (POPO AGIE RIVER) Wyoming | | | | | | | | | |
| Blue Ridge | 8G2 | 9500 | 23 | | 31N | 101W | 1939 | 2,3,4,5 | 1 |
| Bruce's Camp | 8G5 | 6500 | 24 | | 32N | 101W | 1955 | 2,3,4 | 1 |
| Hobb's Park | 9G3 | 10000 | 22 | | 2S | 3W | 1948 | 2,3,4,5 | 1 |
| Mosquito Park R.S. | 9G4 | 9500 | 23 | | 2S | 3W | 1940 | 2,3,4,5 | 1 |
| Sawmill Glade | 8G1 | 8500 | 3 | | 31N | 101W | 1939 | 2,3,4,5 | 1 |
| South Pass | 8G3 | 9000 | 13 | | 30N | 101W | 1939 | 2,3,4,5 | 1 |
| St. Lawrence | 9F11 | 9000 | 26 | | 1N | 4W | 1940 | 2,3,4,5 | 1 |
| Trout Creek | 9G2 | 8400 | 5 | | 2S | 2W | 1948 | 2,3,4,5 | 1 |
| (OWL CREEK) Wyoming | | | | | | | | | |
| Beavers Mill | 9F2 | 8900 | 6 | | 43N | 102W | 1948 | 2,3,4,5 | 1 |
| Owl Creek | 8F1 | 8700 | 36 | | 43N | 101W | 1948 | 2,3,4,5 | 1 |
| (GREYBULL RIVER) Wyoming | | | | | | | | | |
| Timber Creek #1 | 9E2 | 8800 | 25- | | 47N | 103W | 1948 | 2,3,4,5 | 1 |
| Timber Creek #2 | 9E3 | 8800 | 25 | | 47N | 103W | 1955 | 2,3,4,5 | 1 |
| Wood River #1 | 9F1 | 8000 | 28 | | 46N | 103W | 1939 | 2,3,4,5 | 1 |
| Wood River #2 | 9F15 | 8000 | 28 | | 46N | 103W | 1956 | 2,3,4,5 | 1 |
| (SHOSHONE RIVER) Wyoming | | | | | | | | | |
| East Entrance | 10E6 | 7000 | 17 | | 52N | 109W | 1948 | 1,2,3,4,5 | 6 |
| Sylvan Pass | 10E5 | 7100 | 12 | | 52N | 110W | 1936 | 1,2,3,4,5 | 6 |
| (HOWOOD CREEK) Wyoming | | | | | | | | | |
| Cold Springs Camp | 7E25 | 8700 | 1 | | 50N | 88W | 1956 | 2,3,4,5 | 1 |
| Medicine Lodge Lks | 7E24 | 9500 | 7 | | 51N | 87W | 1956 | 2,3,4,5 | 1 |
| Hunkers Pass | 7E8 | 9700 | 11 | | 48N | 85W | 1950 | 2,3,4,5 | 1 |
| North Powder | 7E36 | 8300 | 20 | | 47N | 85W | 1956 | 2,3,4,5 | 1 |
| Onion Gulch | 7E27 | 8100 | 31 | | 48N | 85W | 1956 | 2,3,4,5 | 1 |
| Tensleep Lake | 7E26 | 9075 | 33 | | 50N | 86W | 1956 | 2,3,4,5 | 1 |
| Tensleep R.S. | 7E7 | 8300 | 30 | | 49N | 86W | 1935 | 2,3,4,5 | 1 |
| Tyrell R.S. | 7E35 | 8300 | 30 | | 49N | 86W | 1956 | 2,3,4,5 | 1 |
| (SHELL CREEK) Wyoming | | | | | | | | | |
| Bald Mountain | 7E21 | 9600 | 33 | | 56N | 91W | 1956 | 2,3,4,5 | 1 |
| Beaver-Tongue Div. | 7E20 | 9200 | 12 | | 55N | 91W | 1956 | 2,3,4,5 | 1 |
| Bone-Spring Div. | 7E18 | 9200 | 32 | | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Granite Creek Camp | 7E22 | 7800 | 15 | | 53N | 89W | 1956 | 2,3,4,5 | 1 |
| Granite Pass | 7E17 | 8950 | 19 | | 54N | 88W | 1956 | 2,3,4,5 | 1 |
| Horse-Trail Div. | 7E19 | 9200 | 29 | | 55N | 90W | 1956 | 2,3,4,5 | 1 |
| Ranger Creek | 7E4 | 8800 | 32 | | 53N | 88W | 1935 | 2,3,4,5 | 1 |
| Shell Creek | 7E23 | 9600 | 12 | | 52N | 88W | 1956 | 2,3,4,5 | 1 |
| (PORCUPINE CREEK) Wyoming | | | | | | | | | |
| Five Spgs. Falls | 7E31 | 7500 | 19 | | 56N | 92W | 1956 | 2,3,4,5 | 1 |
| Medicine Wheel | 7E30 | 9000 | 24 | | 56N | 92W | 1956 | 2,3,4,5 | 1 |
| (TONGUE RIVER) Wyoming | | | | | | | | | |
| Beaver Tongue Div. | 7E20 | 9200 | 12 | | 55N | 91W | 1956 | 2,3,4,5 | 1 |
| Big Goose #1 | 7E2 | 7700 | 4 | | 53N | 86W | 1935 | 2,3,4,5 | 1 |
| Big Goose #2 | 7E32 | 7700 | 4 | | 53N | 86W | 1955 | 2,3,4,5 | 1 |
| Bone-Spring Div. | 7E18 | 9200 | 32 | | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Burgess R.S. #1 | 7E1 | 7900 | 36 | | 56N | 89W | 1950 | 2,3,4,5 | 1 |
| Burgess R.S. #2 | 7E33 | 7900 | 36 | | 56N | 89W | 1955 | 2,3,4,5 | 1 |
| Dome Lake #1 | 7E3 | 8800 | 11 | | 53N | 87W | 1950 | 2,3,4,5 | 1 |
| Dome Lake #2 | 7E34 | 8800 | 11 | | 53N | 87W | 1950 | 2,3,4,5 | 1 |
| Gloom Creek | 7E14 | 9300 | 32 | | 55N | 87W | 1956 | 2,3,4,5 | 1 |
| Granite Pass | 7E17 | 8950 | 19 | | 54N | 88W | 1956 | 2,3,4,5 | 1 |

| Drainage Basin and Course Name | Montana Number | Elev. | Location Sec. | Lat. | Twp. | Range Long. | Record Began | Measuring Dates | Measured By |
|---|---|---|---|---|---|---|---|---|---|
| MISSOURI RIVER DRAINAGE (cont.) | | | | | | | | | |
| (TONGUE RIVER cont.) | | | | | | | | | |
| Horse Trail Div. | 7E19 | 9200 | 29 | | 55N | 90W | 1956 | 2,3,4,5 | 1 |
| Lake Geneva | 7E16 | 9000 | 7 | | 52N | 86W | 1956 | 2,3,4,5 | 1 |
| North Tongue | 7E15 | 8800 | 17 | | 55N | 89W | 1956 | 2,3,4,5 | 1 |
| Sibley Lake | 7E11 | 8000 | 10 | | 55N | 88W | 1956 | 2,3,4,5 | 1 |
| Sucker Creek | 7E12 | 9000 | 19 | | 55N | 87W | 1956 | 2,3,4,5 | 1 |
| Steamboat Point | 7E10 | 7500 | 32 | | 56N | 87W | 1956 | 2,3,4,5 | 1 |
| Wood Rock O.S. | 7E13 | 8500 | 3 | | 54N | 88W | 1956 | 2,3,4,5 | 1 |
| (POWDER RIVER) Wyoming | | | | | | | | | |
| Crazy Woman | 6E2 | 8200 | 6 | | 47N | 84W | 1956 | 2,3,4,5 | 1 |
| Muddy Creek O.S. | 6E1 | 7800 | 2 | | 48N | 84W | 1956 | 2,3,4,5 | 1 |
| Munkers Pass | 7E8 | 9700 | 11 | | 48N | 85W | 1950 | 2,3,4,5 | 1 |
| North Powder #2 | 7E36 | 8300 | 20 | | 47N | 85W | 1956 | 2,3,4,5 | 1 |
| Onion Gulch | 7E27 | 8100 | 31 | | 48N | 85W | 1956 | 2,3,4,5 | 1 |
| Soldier Park | 7E5 | 8700 | 36 | | 51N | 85W | 1950 | 2,3,4,5 | 1 |
| Sour Dough | 7E6 | 8500 | 17 | | 49N | 84W | 1936 | 2,3,4,5 | 1 |
| COLUMBIA RIVER BASIN | | | | | | | | | |
| KOOTENAI RIVER | | | | | | | | | |
| Baree Creek | 15B11 | 5500 | 6 | | 25N | 30W | 1956 | 4,5,5½ | 2 |
| Baree Mountain | 15B1 | 6000 | 1 | | 25N | 31W | 1937 | 4,5,5½ | 2 |
| Red Mountain | 15A1 | 6000 | 4 | | 36N | 29W | 1937 | 3,4,5,5½ | 1,2 |
| Weasel Divide | 14A7 | 5450 | 8 | | 37N | 24W | 1955 | 4,5,5½ | 1,2 |
| FLATHEAD RIVER | | | | | | | | | |
| Basin Creek | 13B11A | 5000 | 11 | | 19N | 12W | 1951 | 2,3,4,5 | 2 |
| Big Creek | 13B3 | 6750 | 647 | | 22N | 18W | 1941 | 3,4,5 | 5 |
| Brush Creek | 14A4 | 5000 | 13 | | 30N | 26W | 1937 | 3,4,5 | 1,2 |
| Cattle Queen | 13A1 | 4700 | 7 | | 35N | 17W | 1939 | 3,4,5 | 6 |
| Desert Mountain | 13A2M | 5600 | 24 | | 31N | 19W | 1937 | 1,2,3,4,5 | 1,2 |
| Hell Roaring Div. | 14A3 | 5770 | 35 | | 32N | 22W | 1942 | 3,4,5 | 1,2 |
| Holbrook | 13B13A | 4530 | 18 | | 21N | 13W | 1951 | 1,2,3,4,5 | 2 |
| Kishenehn | 14A6 | 3886 | 14 | | 37N | 22W | 1954 | 4,5 | 6 |
| Logan Creek | 14A5 | 4300 | 34 | | 30N | 24W | 1937 | 3,4,5 | 2 |
| Marias Pass | 13A5M | 5250 | 34 | | 30N | 14W | 1934 | 1,2,3,4,5 | 3 |
| Mineral Creek | 13A16 | 4000 | 29 | | 35N | 17W | 1957 | 3,4,5 | 6 |
| Quintonkon | 13A13 | 3800 | 11 | | 26N | 17W | 1951 | 2,3,4,5 | 1,2 |
| Spotted Bear Mt. | 13B2M | 7000 | 23 | | 25N | 15W | 1948 | 3,4,5 | 1,2 |
| Strawberry Lake | 13A10 | 6500 | 11 | | 28N | 19W | 1948 | 3,4,5 | 2 |
| Trinkus Lake | 13B1 | 6500 | 9 | | 25N | 17W | 1948 | 3,4,5 | 2 |
| Trout Lake | 13A12M | 3600 | 21 | | 28N | 17W | 1948 | 3,4,5 | 1,2 |
| Twin Creeks | 13B11 | 3580 | 14 | | 26N | 16W | 1951 | 2,3,4,5 | 1,2 |
| Upper Holland Lk. | 13B5 | 7000 | 28 | | 20N | 16W | 1948 | 3,4,5 | 2 |
| CLARK FORK | | | | | | | | | |
| Baree Creek | 15B11 | 5500 | 6 | | 25N | 30W | 1956 | 4,5,5½ | 2 |
| Baree Mountain | 15B1 | 6000 | 1 | | 25N | 31W | 1937 | 4,5,5½ | 2 |
| Black Pine | 13C13 | 7100 | 25 | | 8N | 15W | 1960 | 3,4,5 | 1 |
| Coyote Hill | 13B10 | 4200 | 12 | | 18N | 16W | 1952 | 1,2,3,4,5 | 2 |
| El Dorado Mine | 13C9 | 7800 | 23 | | 8N | 17W | 1949 | 4 | 1 |
| Fred Burr Pass | 13C11 | 8000 | 12 | | 6N | 13W | 1957 | 3,4,5 | 1 |
| Freezeout Summit | 15B10 | 6800 | 21 | | 15N | 27W | 1937 | 4,5 | 2 |
| Gold Creek Lk. | 13C10 | 7200 | 14 | | 8N | 12W | 1949 | 4 | 1 |
| Hoodoo Creek | 15C1 | 6200 | 9 | | 14N | 27W | 1937 | 4,5 | 2 |
| Intergaard | 13C4 | 6450 | 6 | | 5N | 13W | 1936 | 2,3,4 | 4 |
| Lubrecht Forest #6 | 13C8 | 4400 | 11 | | 14N | 15W | 1951 | 1,2,3,4,5 | 12 |
| North Fork Jocko | 13B7 | 6330 | 3 | | 17N | 17W | 1941 | 3,4,5 | 5 |
| Pipestone Pass | 12D1 | 7200 | 10 | | 1N | 7W | 1938 | 2,3,4,5 | 1 |
| Red Lion | 13C12 | 7000 | 27 | | 6N | 13W | 1958 | 3,4,5 | 1 |
| Slide Rock Mt. | 13C2 | 7100 | 35 | | 10N | 16W | 1937 | 4 | 1 |
| Southern Cross | 13C5 | 6500 | 8 | | 5N | 13W | 1936 | 2,3,4 | 4 |
| Steeple Pass | 12C1 | 6900 | 16 | | 13N | 7W | 1934 | 3,4,5 | 3 |
| Storm Lake | 13C7 | 7780 | 19 | | 4N | 13W | 1939 | 2,3,4 | 1 |
| Stuart Mill | 13C6 | 6500 | 19 | | 5N | 13W | 1936 | 2,3,4 | 4 |
| Stuart Mountain | 13C1 | 7400 | 6 | | 14N | 18W | 1936 | 4 | 1,2 |
| TV Mountain | 14B1 | 6800 | 33 | | 15N | 19W | 1956 | 1,2,3,4,5 | 1 |
| BITTERROOT RIVER | | | | | | | | | |
| Ambrose | 13C16 | 6475 | 28 | | 9N | 18W | 1960 | 3,4,5 | 1 |
| East Fork R.S. | 13D1 | 5400 | 16 | | 2N | 17W | 1937 | 4 | 1 |
| Gibbons Pass | 13D2 | 7100 | 4 | | 2S | 19W | 1934 | 1,2,3,4,5 | 3,1 |
| Lolo Pass | 14C5 | 5230 | 16 | | 38N | 15E | 1956 | 3,4,5,5½ | 2 |
| Lost Horse | 14C7 | 5940 | 5 | | 4N | 23W | 1960 | 3,4,5 | 1 |
| Nez Perce Camp | 14D2 | 5580 | 19420 | | 1S | 23W | 1937 | 3,4,5 | 1 |
| Nez Perce Pass | 14D1 | 6575 | 32 | | 28N | 17E | 1937 | 1,2,3,4,4½,5,5½ | 1 |
| Powell R.S. | 14C6 | 4230 | 33 | | 37N | 14E | 1956 | 3,4,5,5½ | 2 |
| Skalkaho Summit | 13C3 | 7259 | 30 | | 6N | 17W | 1937 | 4 | 1 |
| Twin Lakes | 14C8 | 6510 | 32 | | 5N | 23W | 1960 | 3,4,5 | 1 |
| SASKATCHEWAN RIVER BASIN | | | | | | | | | |
| ST. MARY RIVER | | | | | | | | | |
| Iceberg Lake #3 | 13A3 | 5600 | 48°-50' | | | 113°-43' | 1922 | 5 | |
| Josephine Upper | 13A15 | 5000 | 48°-50' | | | 113°-42' | 1956 | 5 | 3,9 |
| Josephine Lower #9 | 13A14 | 4900 | 48°-47' | | | 113°-41' | 1955 | 5 | |
| Mount Allen #7 | 13A7 | 5700 | 48°-46' | | | 113°-41' | 1922 | 5 | 3,9 |
| Piegan #6 | 13A6 | 5500 | 48°-46½' | | | 113°-41½' | 1922 | 5 | 3,9 |
| Ptarmigan #8 | 13A8 | 5800 | 48°-50' | | | 113°-44' | 1937 | 5 | 3,9 |

a. Numerals 1,2,3,4 and 5 refer to January 1, February 1, March 1, April 1 and May 1.

b. Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. City of Bozeman
9. Dominion Water & Power Bureau
10. U. S. Fish and Wildlife Service
11. U. S. Bureau of Reclamation
12. Montana State Forestry School

H - Soil Moisture
A - Aerial Marker

5,M-11,464 - (1960)

## COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds April 1, 1960

| TRIBUTARY WATERSHED | No. of Courses Averaged | No. Years Used | 1960 Snow Water Equivalent Expressed as Percent of | |
|---|---|---|---|---|
| | | | 1959 | Average |
| **COLUMBIA RIVER BASIN IN MONTANA** | | | | |
| Kootenai above Libby | 14 | 7-15 | 73 | 74 |
| Flathead | 21 | 7-15 | 71 | 87 |
| Lower Clark Fork | 9 | 7-15 | 68 | 74 |
| Upper Clark Fork | 15 | 6-15 | 63 | 66 |
| Bitterroot | 9 | 14-15 | 72 | 66 |
| **MISSOURI RIVER BASIN IN MONTANA** | | | | |
| Marias, Teton & Sun | 11 | 9-15 | 47 | 50 |
| Missouri Main Stem | 7 | 14-15 | 63 | 74 |
| Beaverhead-Jefferson | 31 | 10-15 | 72 | 63 |
| Madison-Gallatin | 10 | 12-15 | 68 | 62 |
| Judith-Musselshell | 5 | 15 | 74 | 86 |
| Upper Yellowstone | 16 | 9-15 | 63 | 65 |

AVAILABLE SOIL MOISTURE
as of
April 1, 1960

| Drainage Basin and Station | Station No. | Elev. | Soil Profile in Inches | | Date | Soil Moisture Content in Inches About 4/1/60 | | | | Yrs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Cap. | | 1960 | 1959 | 1958 | Avg. | |
| GALLATIN | | | | | | | | | | |
| College Site | 11D2M | 4856 | 54 | 14.5 | 4/1 | 12.6 | 11.6 | 8.2 | 9.6 | 3 |
| FLATHEAD | | | | | | | | | | |
| Marias Pass | 13A5M | 5250 | 54 | 8.4 | 3/26 | 6.6 | 6.7 | 5.7 | 6.2 | 6 |
| Spotted Bear R.S. | 13B15M | 3700 | 28 | 5.9 | 3/29 | 5.3 | 5.3 | 5.1 | 5.4 | 3 |
| Trout Lake | 13A12M | 3600 | 54 | 11.8 | 3/28 | 12.5 | 12.0 | 12.5 | 12.4 | 3 |

AVAILABLE SOIL MOISTURE
as of
October 1, 1959

| | | | | | | 1959 | 1958 | 1957 | Avg. | |
|---|---|---|---|---|---|---|---|---|---|---|
| GALLATIN | | | | | | | | | | |
| College Site | 11D2M | 4856 | 54 | 14.5 | 10/2 | 8.6 | 6.8 | 4.4 | 5.8 | 4 |
| FLATHEAD | | | | | | | | | | |
| Marias Pass | 13A5M | 5250 | 54 | 8.4 | 10/1 | 5.6 | 4.5 | 3.4 | 4.5 | 5 |
| Spotted Bear R.S. | 13B15M | 3700 | 28 | 5.9 | 9/29 | 4.3 | 3.7 | 1.2 | 2.7 | 3 |
| Trout Lake | 13A12M | 3600 | 54 | 11.8 | 9/29 | 9.8 | 10.5 | 2.1 | 7.2 | 3 |

# WATER SUPPLY OUTLOOK

## KOOTENAI RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Survey measurements made on or about April first in the Kootenai River basin indicate the water stored in the snow-pack is less than was measured on or about March first at a majority of the snow courses. Water content as of April first at snow courses in the Kootenai basin is 73 percent of last year and 74 percent of the 1943-57 average.

Stream flow for the Kootenai River basin is forecast to be about 10 percent less than average. April through September runoff at Libby is forecast at 6,896,000 acre feet. Tributary streams in the northern portion of the drainage should flow 10 to 15 percent below average; those in the southern portion should flow about 25 percent below average.

*Report Prepared by*

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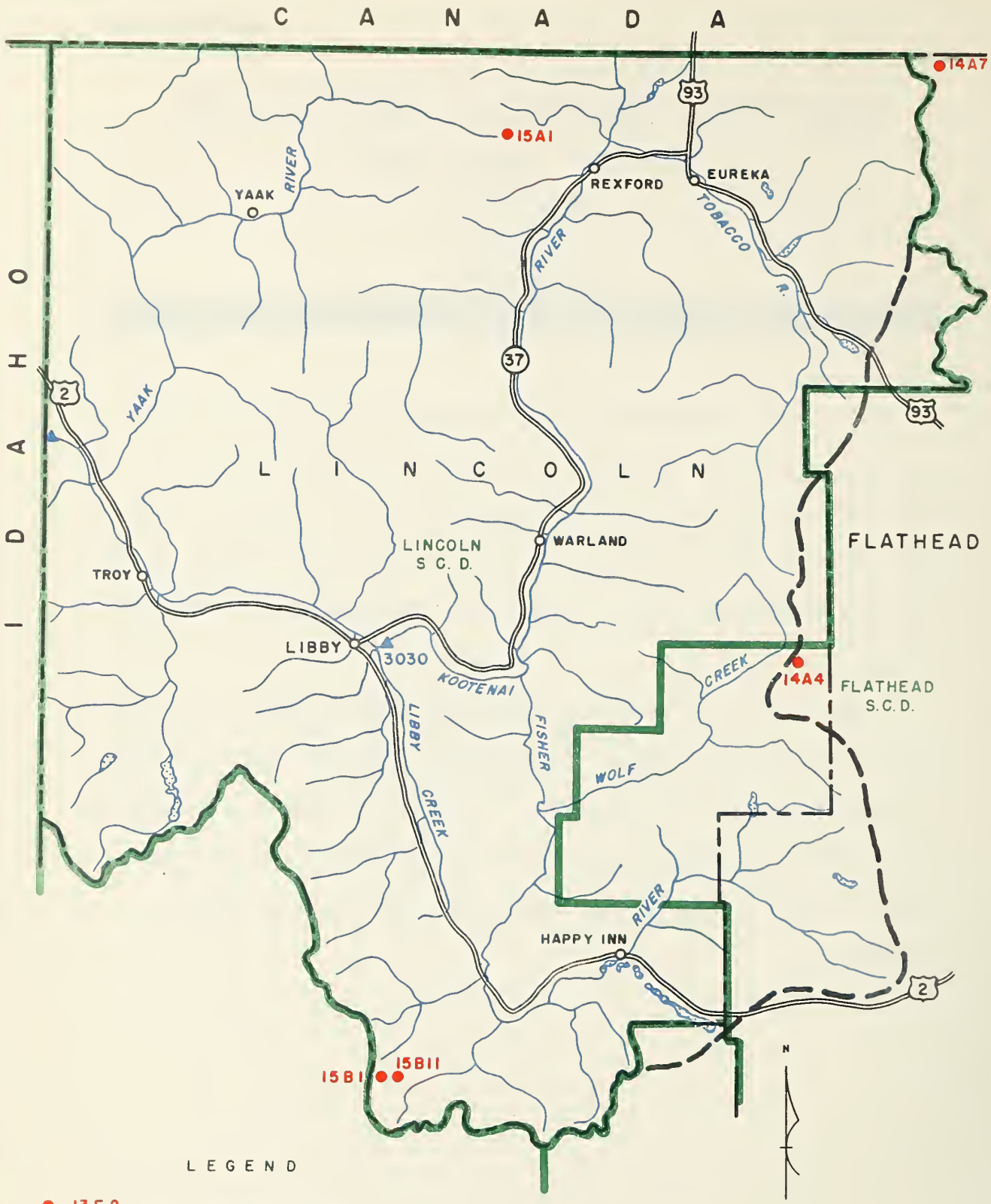
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,507.1




USDA-SCS-LINCOLN NEBR 1960



5,L-16,507.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED I

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR | NORMAL |
| | KOOTENAI RIVER | | | | | |
| 3030 | Libby (at) | Apr-Sept | 6896 | 89 | 9820 | 7722 |
| | | Apr-July | 5958 | 89 | 8088 | 6694 |
| 3050 | Leonia (at) | Apr-Sept | 8300 | 93 | 10969 | 8907 |
| | | Apr-July | 8520 | 93 | 9162 | 7818 |

(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| | | | | | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960 WATERSHED I

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 15B11 | Baree Creek | 5500 | 4/1 | 106 | 36.7 | 57.2 | - | - |
| 15B1 | Baree Mountain | 6000 | 4/1 | 104 | 36.0 | 54.3 | 46.4 | 15 |
| 14A4 | Brush Creek | 5000 | 3/24 | 35 | 11.1 | 14.8 | 15.2 | 9 |
| Can 10 | Fernie | 3500 | 4/1 | 17 | 4.3 | 8.4 | 8.4 | 15 |
| Can 12A | Field | 4200 | 3/30 | 11 | 3.4 | 8.1 | 5.2 | 15 |
| Can 43 | Gray Creek | 5100 | 3/26 | 53 | 17.1 | 18.7 | 20.6 | 10 |
| Can 33 | Kicking Horse | 5400 | 3/31 | 40 | 11.2 | 17.6 | 15.0 | 11 |
| Can 20B | Kimberley | 3800 | 3/31 | 15 | 4.4 | 6.7 | 6.8 | 15 |
| Can 32 | Marble Canyon | 5000 | 3/30 | 38 | 7.1 | 13.5 | 14.9 | 11 |
| Can 10A | New Fernie | 4100 | 4/1 | 36 | 9.4 | 15.2 | 16.6 | 7 |
| 15A1 | Red Mountain | 6000 | 3/22 | 56 | 18.2 | 20.2 | 21.5 | 15 |
| Can 8A | Sinclair Pass | 4500 | 3/30 | 18 | 4.1 | 4.7 | 6.0 | 15 |
| Can 20A | Sullivan Mine | 5100 | 3/31 | 41 | 12.2 | 14.6 | 16.0 | 12 |
| Can 41 | Upper Elk River | 4400 | 3/30 | 13 | 3.1 | 7.7 | 9.3 | 10 |
| 14A7 | Weasel Divide | 5450 | 3/23 | 87 | 31.5 | 33.9 | 33.4 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

# WATER SUPPLY OUTLOOK

## FLATHEAD RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Surveys made in the Flathead River basin on or about the first of April indicate the water stored in the snow-pack is about 30 percent below that of April first last year and 87 percent of the 1943-57 average.

Streamflow in the drainage is forecast at about 10 to 20 percent below average. The South Fork of the Flathead near Columbia Falls is expected to flow 1,819,000 acre feet during the April through September period. This is about 40 percent less than last year. The North Fork of the Flathead should flow about 25 percent less than last year, with the Middle Fork of the Flathead producing 65 percent of last year's flow.

Ungaged tributary streams in the basin should flow 60 to 70 percent of last year.

Reservoir storage is above average in both power and irrigation reservoirs.

*Report Prepared by*

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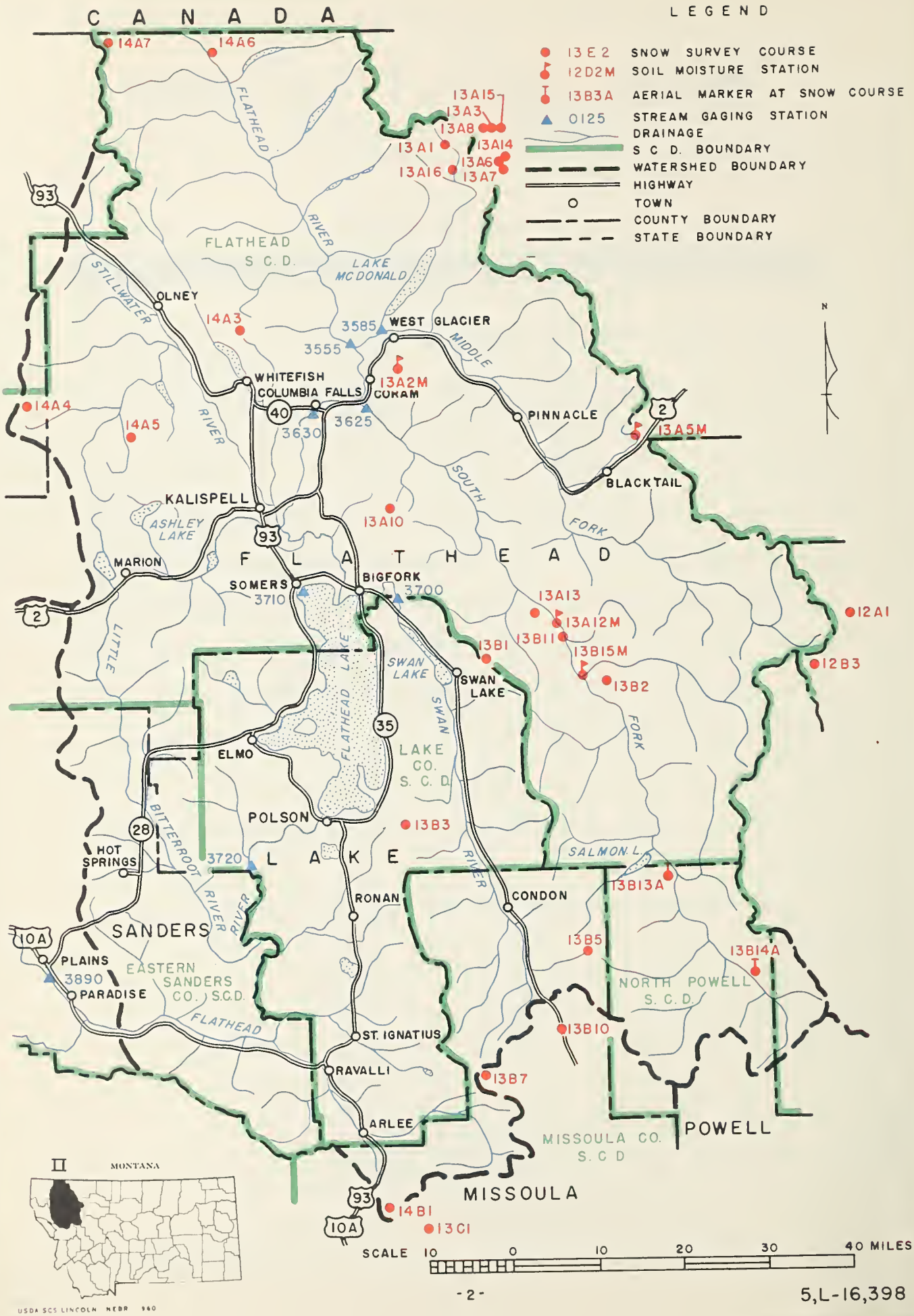
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,398.1


CANADA
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S C D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
14A7
14A6
13A15
13A3
13A8
13A1
13A14
13A6
13A7
13A16
FLATHEAD
RIVER
FLATHEAD S C D.
LAKE MC DONALD
STILLWATER
OLNEY
14A3
3585
WEST GLACIER
3555
MIDDLE
WHITEFISH
COLUMBIA FALLS
13A2M
CORAM
14A4
14A5
3630
3625
PINNACLE
13A5M
BLACKTAIL
KALISPELL
ASHLEY LAKE
13A10
SOUTH FORK
MARION
F L A T H E A D
SOMERS
3710
BIGFORK
3700
13A13
13A12M
13B11
12A1
12B3
13B1
13B15M
13B2
SWAN LAKE
SWAN LAKE
SWAN
FORK
LITTLE
FLATHEAD LAKE
ELMO
LAKE CO. S. C. D.
POLSON
13B3
HOT SPRINGS
3720
L A K E
BITTERROOT RIVER
SALMON L.
13B13A
RONAN
CONDON
SANDERS
PLAINS
3890
PARADISE
EASTERN SANDERS CO. S.C.D.
13B5
13B14A
NORTH POWELL S. C. D.
FLATHEAD
ST. IGNATIUS
13B10
RAVALLI
13B7
ARLEE
MISSOULA CO. S. C D
POWELL
MISSOULA
14B1
13C1
MONTANA
SCALE 10 0 10 20 30 40 MILES
USDA SCS LINCOLN NEBR 960



5,L-16,398

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED II

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | NORTH FORK FLATHEAD RIVER | | | | | |
| 3555 | Columbia Falls (near) | Apr-Sept | 1679 | 86 | 2378 | 1942 |
| | | Apr-July | 1553 | 88 | 2103 | 1769 |
| | | Apr-June | 1312 | 88 | 1766 | 1491 |
| | MIDDLE FORK FLATHEAD RIVER | | | | | |
| 3585 | West Glacier (near) | Apr-Sept | 1514 | 80 | 2361 | 1881 |
| | | Apr-July | 1411 | 81 | 2156 | 1747 |
| | | Apr-June | 1200 | 81 | 1796 | 1480 |
| | SOUTH FORK FLATHEAD RIVER | | | | | |
| 3625 | Columbia Falls (nr)(17) | Apr-Sept | 1819 | 79 | 3166 | 2297 |
| | | Apr-July | 1755 | 80 | 2955 | 2180 |
| | | Apr-June | 1520 | 80 | 2515 | 1900 |
| | FLATHEAD RIVER | | | | | |
| 3630 | Columbia Falls (at)(17) | Apr-Sept | 5148 | 82 | 7921 | 6299 |
| | | Apr-July | 4793 | 82 | 7249 | 5845 |
| | | Apr-June | 4109 | 82 | 6071 | 4993 |
| 3720 | Polson (near) (18) | Apr-Sept | 6089 | 82 | 9801 | 7462 |
| | | Apr-July | 5716 | 82 | 8906 | 6939 |
| | | Apr-June | 4868 | 82 | 7464 | 5897 |
| | SWAN RIVER | | | | | |
| 3700 | Big Fork (near) | Apr-Sept | 577 | 90 | 997 | 641 |
| | | Apr-July | 521 | 92 | 864 | 568 |
| | | Apr-June | 414 | 90 | 672 | 460 |

(17) Observed flow plus change in storage in Hungry Horse Reservoir.
(18) Observed flow plus change in storage in Hungry Horse Reservoir and Flathead Lake.
( +) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 3620 | Hungry Horse | 3428.0 | 2841.0 | 2286.0 | 2022.0 |
| 3710 | Flathead | 1791.0 | 867.8 | 883.4 | 628.8 |
| 3757 | Camas | 42.8 | 37.3 | 28.9 | 26.5 |
| 3800 | Mission Valley | 98.6 | 53.0 | 34.2 | 38.6 |
| 3805 | Lower Jocko Lake | 7.6 | 1.4 | Snowbound | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS LINCOLN NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF

APRIL 1, 1960

WATERSHED II

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 13B14A | Basin Creek | 5000 | 4/3 | 10 | 6.2 | 9.1 | 10.0 | 7 |
| 14B3 | Bassoo Creek | 4400 | 3/16 | 38 | 10.0 | - | - | - |
| 13B3 | Big Creek | 6750 | 3/30 | 111 | 45.8 | 60.8 | 43.4 | 15 |
| 14A4 | Brush Creek | 5000 | 3/24 | 35 | 11.1 | 14.8 | 15.2 | 9 |
| 13A1 | Cattle Queen | 4700 | 4/2 | 74 | 27.7 | 34.4E | 34.4 | 15 |
| 13A2M | Desert Mountain | 5600 | 3/25 | 46 | 15.9 | 17.6 | 16.6 | 15 |
| Can 10 | Fernie | 3500 | 4/1 | 17 | 4.3 | 8.4 | 8.4 | 15 |
| 14A9 | Griffin Creek Divide | 5100 | 3/15 | 46 | 11.8 | - | - | - |
| 14A3 | Hell Roaring Divide | 5770 | 3/21 | 88 | 33.2 | 32.5 | 31.2 | 15 |
| 13B13A | Holbrook | 4530 | 4/3 | 15 | 6.6 | 11.8 | 10.4 | 7 |
| 14A6 | Kishenehn | 3886 | 3/28 | 25 | 6.9 | 8.9 | 10.8 | 15 |
| 14A5 | Logan Creek | 4300 | 3/24 | 24 | 5.7 | 11.1 | 9.8 | 15 |
| 13A5M | Marias Pass | 5250 | 4/2 | 37 | 12.5 | 21.1 | 20.3 | 15 |
| 13A16 | Mineral Creek | 4500 | 4/2 | 53 | 20.2 | 23.3 | - | - |
| Can 10A | New Fernie | 4100 | 4/1 | 36 | 9.4 | 15.2 | 16.6 | 7 |
| 13B7 | North Fork Jocko | 6330 | 3/31 | 101 | 40.8 | 62.4 | 44.4 | 15 |
| 13A13 | Quintonkon | 3800 | 3/30 | 35 | 12.0 | 20.2 | 14.9 | 7 |
| 13B2 | Spotted Bear Mountain | 7000 | 3/29 | 34 | 12.0 | 21.1 | 16.0 | 10 |
| 13A10 | Strawberry Lake | 6500 | 3/31 | 112 | 48.6 | 56.7 | 44.0 | 10 |
| 13B1 | Trinkus Lake | 6500 | 3/31 | 108 | 40.1 | 69.4 | 42.4 | 10 |
| 13A12M | Trout Lake | 3600 | 3/28 | 35 | 14.3 | 17.8 | 17.8 | 10 |
| 14B1 | TV Mountain | 6800 | 4/3 | 44 | 12.3 | 22.0 | - | - |
| 13B11 | Twin Creeks | 3580 | 3/28 | 26 | 9.5 | 15.6 | 10.6 | 7 |
| 13B5 | Upper Holland Lake | 7000 | 3/31 | 84 | 27.6 | 48.9 | 37.6 | 9 |
| 14A7 | Weasel Divide | 5450 | 3/23 | 87 | 31.5 | 33.9 | 33.4 | 15 |

E Estimated water content.

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## LOWER CLARK FORK RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for 1960 on the Clark Fork River is only FAIR. Streamflow forecasts for the April-September period range from 78 to 68 percent average. A comparison with last year's flow indicates that the 1960 flow will be 32 to 40 percent less than last year.

Snow Surveys made on or about April first indicate a very low streamflow this season; however, the above normal precipitation this past fall, together with a high base flow during the winter, has raised streamflow percent average above the percent average indicated by the snow-pack.

Detail forecast volumes and comparisons with the 1943-57 average are shown on Page 3 opposite the map of the Lower Clark Fork Watershed III.

Soil moisture beneath the snow-pack is above average.

Reservoir storage in Flathead Lake and Hungry Horse Reservoir is above the April first average.

*Report Prepared by*

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,506.1

USDA SCS-LINCOLN, NEBR 1960

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED III

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | BLACKFOOT RIVER | | | | | |
| 3400 | Bonner (near) | Apr-Sept | 745 | 74 | 1338 | 999 |
| | | Apr-July | 665 | 73 | 1214 | 903 |
| | | Apr-June | 541 | 70 | 1050 | 775 |
| | CLARK FORK RIVER | | | | | |
| 3404 | Milltown (above) (14) | Apr-Sept | 533 | 65 | 696 | 815 |
| | | Apr-July | 452 | 63 | 610 | 716 |
| | | Apr-June | 388 | 64 | 516 | 609 |
| 3405 | Missoula (above) | Apr-Sept | 1278 | 70 | 2034 | 1814 |
| | | Apr-July | 1117 | 69 | 1824 | 1620 |
| | | Apr-June | 928 | 67 | 1566 | 1384 |
| 3530 | Missoula (below) | Apr-Sept | 2300 | 68 | 3709 | 3361 |
| | | Apr-July | 2045 | 67 | 3331 | 3059 |
| | | Apr-June | 1693 | 65 | 2885 | 2608 |
| 3545 | St. Regis (at) | Apr-Sept | 3061 | 67 | 5135 | 4549 |
| | | Apr-July | 2728 | 66 | 4634 | 4140 |
| | | Apr-June | 2254 | 63 | 4023 | 3551 |
| 3890 | Plains (near) (18) | Apr-Sept | 9478 | 77 | 15427 | 12330 |
| | | Apr-July | 8718 | 77 | 13965 | 11308 |
| | | Apr-June | 7280 | 76 | 11859 | 9617 |
| 3910 | Thompson Falls (at)(18) | Apr-Sept | 10112 | 78 | 16323 | 13017 |
| | | Apr-July | 9300 | 78 | 14806 | 11944 |
| | | Apr-June | 7780 | 77 | 12472 | 10156 |
| 3920 | Whitehorse Rapids (at)(19) | Apr-Sept | 10676 | 77 | 11454# | 13932 |
| | | Apr-July | 9816 | 77 | 10579# | 12763 |
| | | Apr-June | 8193 | 76 | 9712# | 10816 |

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.
(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir.
( #) 1958 data; 1959 data not available.
( +) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 3913 | Noxon | 200.1 | 179.0 | 0 | - |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED III

| SNOW COURSE NO. | NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 15B11 | Baree Creek | 5500 | 4/1 | 106 | 36.7 | 57.2 | - | - |
| 15B1 | Baree Mountain | 6000 | 4/1 | 104 | 36.0 | 54.3 | 46.4 | 15 |
| 13B10 | Coyote Hill | 4200 | 3/31 | 27 | 8.4 | 12.4 | 11.2 | 11 |
| 15C2 | Fish Lake Airstrip | 5000 | 4/3 | 89 | 33.8 | 41.7 | 41.5 | 5 |
| 15B10 | Freezeout Summit | 6800 | 4/4 | 69 | 25.8 | 37.0 | 36.8 | 15 |
| 15C1 | Hoodoo Creek | 6200 | 4/4 | 97 | 37.4 | 56.1 | 53.2 | 15 |
| 14C5 | Lolo Pass | 5230 | 3/24 | 67 | 24.8 | 32.0 | 36.7 | 14 |
| 15B2 | Lookout | 5250 | 3/30 | 86 | 28.5 | 39.8 | 38.7 | 15 |
| 13C8 | Lubrecht Forest #6 | 4040 | 4/1 | 0 | 0 | 2.2 | 3.7 | 7 |
| 13B7 | North Fork Jocko | 6330 | 3/31 | 101 | 40.8 | 62.4 | 44.4 | 15 |
| 14C6 | Powell R. S. | 4230 | 3/24 | 35 | 12.0 | 11.4 | - | - |
| 14C4 | Savage Pass | 6600 | 3/25 | 60 | 21.2 | 29.4 | 30.3 | 14 |
| 14B1 | TV Mountain | 6800 | 4/3 | 44 | 12.3 | 22.0 | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## UPPER CLARK FORK RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Upper Clark Fork River is only FAIR. Snow Surveys made on or about April first at 15 courses in higher elevations of this basin indicate that this year's snow-pack is 37 percent less than last year's snow-pack, and 66 percent of the 1943-57 average.

Streamflow forecast figures are shown in detail on page 3 of this report, opposite the map, for Flint Creek at Maxville, Middle Fork Rock Creek, Boulder River at Maxville, and the Clark Fork above Milltown. Note that the percent average flow is exceedingly low on all streams. Boulder Creek is forecast at 85 percent average and is probably the best local outlook.

Fall precipitation was above average; base flow in all streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack.

Ungaged streams, Race Track Creek and Dempsey Creek, should flow about 37 percent less than last year.

Judging from weather conditions this spring, it is anticipated that runoff will be early this year. A cold May could reverse this prediction.

*Report Prepared by*

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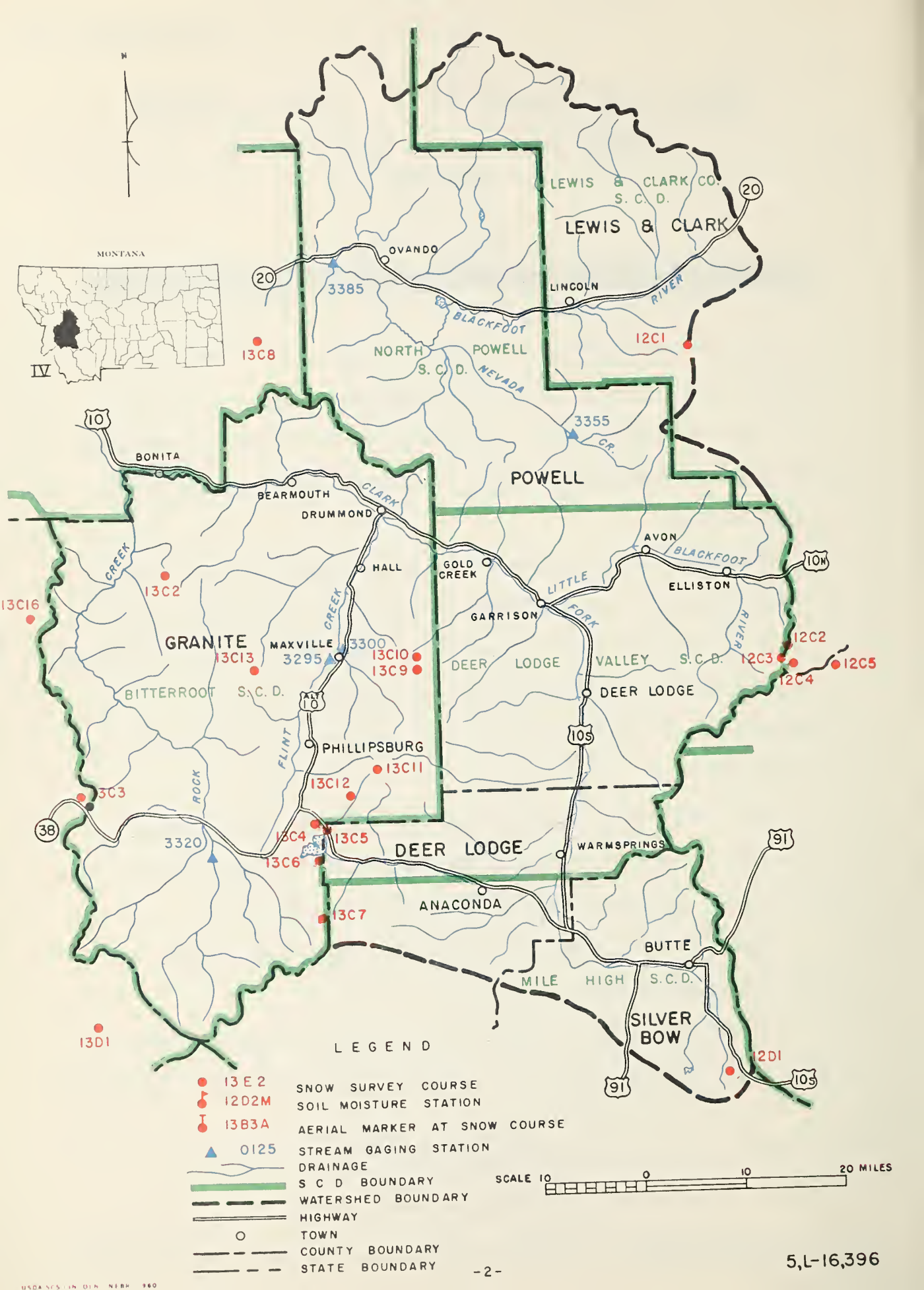
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,396.1






5,L-16,396

USDA SCS-SN-DEN-NEBR 960

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED IV

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED+ | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR | NORMAL |
| | FLINT CREEK | | | | | |
| 3295 | Maxville (at) | Apr-Sept | 29.8 | 64 | 51.5# | 46.4 |
| | | Apr-July | 22.1 | 63 | 37.8# | 35.4 |
| | | Apr-June | 16.8 | 60 | 27.3# | 28.0 |
| | BOULDER CREEK | | | | | |
| 3300 | Maxville (at) | Apr-Sept | 24.2 | 86 | 26.8# | 28.2 |
| | | Apr-July | 21.9 | 85 | 24.6# | 25.8 |
| | | Apr-June | 18.2 | 85 | 20.9# | 21.4 |
| | MIDDLE FORK ROCK CREEK | | | | | |
| 3320 | Philipsburg (near) | Apr-Sept | 62.4 | 78 | 72.1# | 80.2 |
| | | Apr-July | 58.3 | 80 | 65.0# | 72.1 |
| | | Apr-June | 46.2 | 78 | 55.5# | 59.4 |
| | CLARK FORK RIVER | | | | | |
| 3404 | Milltown (above) (14) | Apr-Sept | 533 | 65 | 696 | 815 |
| | | Apr-July | 452 | 63 | 610 | 716 |
| | | Apr-June | 388 | 64 | 516 | 609 |

(14) Difference in observed flow, Clark Fork above Missoula and Blackfoot at Bonner.
( +) Provisional data furnished by U. S. Geological Survey.
( #) 1958 data; 1959 data not available.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| 3250 | Georgetown Lake | 31.0 | 28.8 | 23.2 | 21.6 |
| 3365 | Nevada Creek | 12.6 | - | 3.2 | 8.1 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960 — WATERSHED IV

| SNOW COURSE NO. | NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 13C16 | Ambrose | 6475 | 3/28 | 29 | 8.9 | - | - | - |
| 13C13 | Black Pine | 7100 | 3/23 | 35 | 10.2 | 14.9 | - | - |
| 12C5 | Chessman Reservoir | 6200 | 3/31 | 6 | 1.6 | 6.0 | 5.1 | 15 |
| 13C9 | El Dorado Mine | 7800 | 3/25 | 56 | 18.6 | 23.3 | 22.6 | 6 |
| 13C11 | Fred Burr Pass | 8000 | 3/22 | 58 | 20.4 | 29.9 | - | - |
| 13C10 | Gold Creek Lake | 7200 | 3/25 | 38 | 11.2 | 17.8 | 17.7 | 5 |
| 13C4 | Intergaard | 6450 | 4/1 | 0 | 0 | 8.4 | 8.1 | 12 |
| 13C8 | Lubrecht Forest #6 | 4040 | 4/1 | 0 | 0 | 2.2 | 3.7 | 7 |
| 12D1 | Pipestone Pass | 7200 | 3/31 | 19 | 5.6 | 6.2 | 6.0 | 15 |
| 13C12 | Red Lion | 7000 | 3/22 | 40 | 12.1 | 18.2 | - | - |
| 13C3 | Skalkaho Summit | 7259 | 3/23 | 55 | 18.0 | 28.4 | 28.2 | 15 |
| 13C2 | Slide Rock Mountain | 7100 | 3/24 | 38 | 11.8 | 15.7 | 15.9 | 15 |
| 13C5 | Southern Cross | 6500 | 4/1 | 11 | 3.0 | 6.8 | 6.1 | 12 |
| 12C1 | Stemple Pass | 6900 | 4/1 | 29 | 8.2 | 15.1 | 11.0 | 15 |
| 13C7 | Storm Lake | 7780 | 3/22 | 38 | 11.3 | 15.6 | 15.6 | 15 |
| 13C6 | Stuart Mill | 6500 | 4/1 | 16 | 4.1 | 7.7 | 7.1 | 12 |
| 12C2 | Ten Mile, Lower | 6250 | 4/3 | 13 | 4.1 | 7.9 | 7.2 | 14 |
| 12C3 | Ten Mile, Middle | 6800 | 4/2 | 29 | 9.1 | 11.8 | 11.3 | 15 |
| 12C4 | Ten Mile, Upper | 8000 | 4/2 | 37 | 12.0 | 16.1 | 14.4 | 15 |

NOTE - ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-195 PERIOD.



5.L-16.395.2

# WATER SUPPLY OUTLOOK

## BITTERROOT RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Bitterroot Valley is only FAIR. Snow Survey measurements made on or about April first indicate this year's snow-pack is 28 percent less than last year and only 66 percent of the 1943-57 average.

The Bitterroot River at Darby is forecast to flow 412,000 acre feet of water during the April-September period, or 70 percent average. Fall precipitation was above average; base flow in the streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack.

Soil moisture is extremely high this spring.

Blodgett Creek is forecast to produce the best water supply in the Valley. Burnt Fork Creek is forecast to flow between 60 and 50 percent average.

Forecast figures for the Bitterroot Valley streams are shown on Page 3 of this report.

Reservoir storage data for Como Lake and West Fork Bitterroot Reservoir for comparison with other years are not available at this time.

*Report Prepared by*

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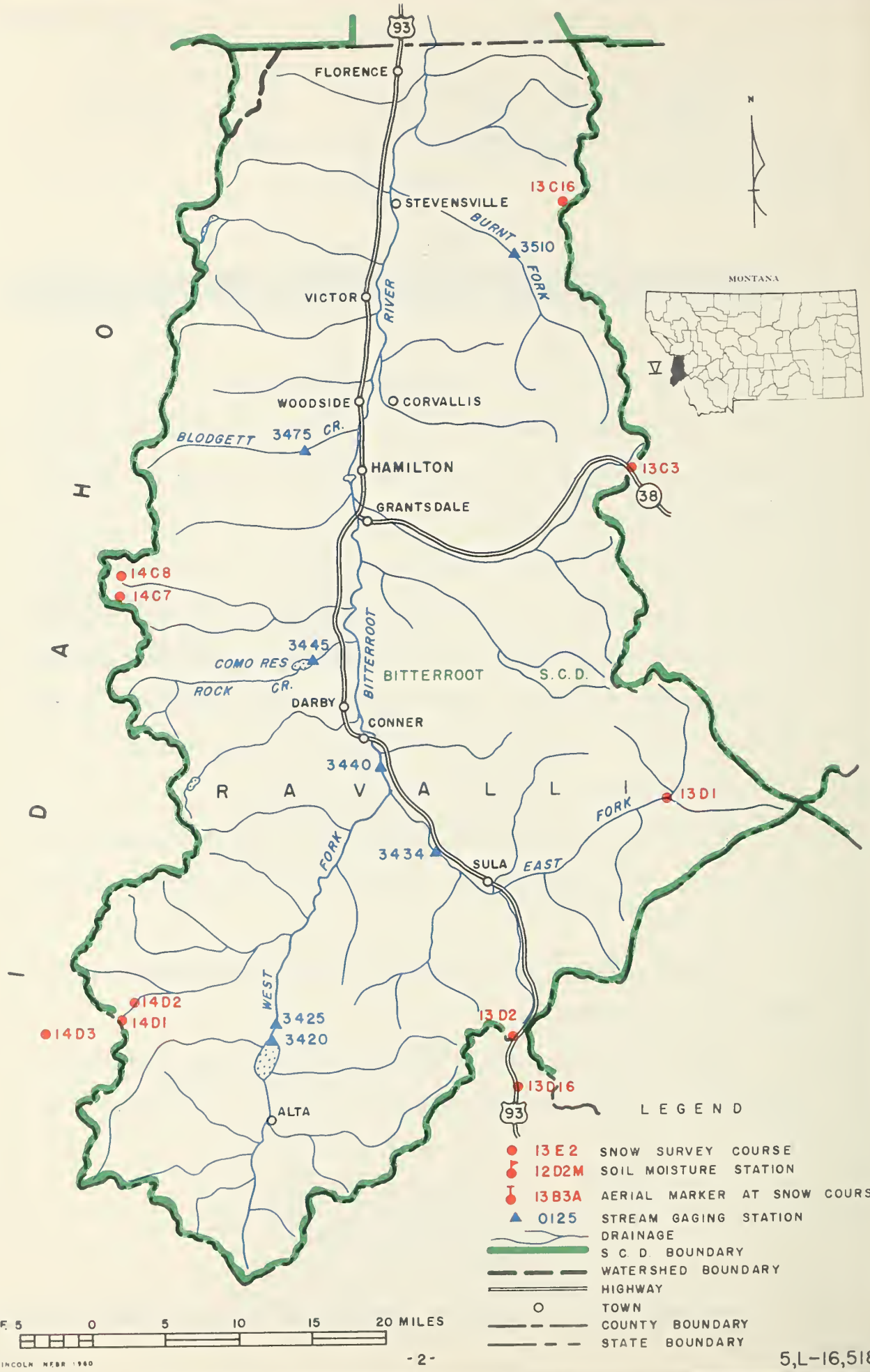
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,518.1


93
FLORENCE
STEVENSVILLE
13C16
BURNT FORK
3510
VICTOR
RIVER
MONTANA
WOODSIDE
CORVALLIS
BLODGETT
3475 CR.
HAMILTON
13C3
38
GRANTSDALE
14C8
14C7
3445
COMO RES
ROCK CR.
BITTERROOT
BITTERROOT S.C.D.
DARBY
CONNER
3440
RAVALLI
13D1
FORK
3434
SULA
EAST FORK
WEST FORK
14D2
14D1
14D3
3425
3420
13D2
13D16
ALTA
93
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S.C.D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
SCALE 5 0 5 10 15 20 MILES
USDA SCS LINCOLN NEBR 1960



5,L-16,518.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED V

(1000 Acre Feet)

| FORECAST POINT | | FORECAST | FORECAST | % | MEASURED + | |
|---|---|---|---|---|---|---|
| NO. | NAME | PERIOD | THIS YEAR | NORMAL | LAST YEAR | NORMAL |
| | WEST FORK BITTERROOT RIVER | | | | | |
| 3425 | Conner (near) (15) | Apr-Sept | 96.8 | 55 | 193 | 176 |
| | | Apr-July | 86.7 | 53 | 181 | 164 |
| | | Apr-June | 73.7 | 50 | 166 | 147 |
| | BITTERROOT RIVER | | | | | |
| 3440 | Darby (near) | Apr-Sept | 412 | 70 | 593 | 587 |
| | | Apr-July | 374 | 68 | 545 | 547 |
| | | Apr-June | 301 | 63 | 480 | 477 |
| | BLODGETT CREEK | | | | | |
| 3475 | Corvallis (near) | Apr-Sept | 43.1 | 92 | 46.5 | 46.7 |
| | | Apr-July | 38.8 | 87 | 43.6 | 44.4 |
| | | Apr-June | 32.3 | 85 | 37.1 | 37.9 |
| | BURNT FORK CREEK | | | | | |
| 3510 | Stevensville (near) | Apr-Sept | 18.9 | 60 | 25.5 | 31.2 |
| | | Apr-July | 15.7 | 56 | 22.2 | 28.0 |
| | | Apr-June | 11.3 | 50 | 18.8 | 23.1 |

(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| | | | | | |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960 WATERSHED V

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 13C16 | Ambrose | 6475 | 3/28 | 29 | 8.9 | - | - | - |
| 13D1 | East Fork R. S. | 5400 | 3/31 | 16 | 4.4 | 7.5 | 7.1 | 15 |
| 13D2 | Gibbons Pass | 7100 | 3/31 | 52 | 16.6 | 23.5 | 25.7 | 15 |
| 14D3 | Kit Carson | 4700 | 3/30 | 22 | 6.9 | 9.2 | 9.0 | 15 |
| 14C5 | Lolo Pass | 5230 | 3/24 | 67 | 24.8 | 32.0 | 36.7 | 14 |
| 14C7 | Lost Horse | 5940 | 3/29 | 68 | 24.4 | - | - | - |
| 13D16 | Moose Creek | 6200 | 3/25 | 39 | 12.7 | 14.5 | 18.3 | 15 |
| 14D2 | Nez Perce Camp | 5580 | 3/30 | 36 | 11.2 | 14.1 | 15.5 | 15 |
| 14D1 | Nez Perce Pass | 6575 | 3/30 | 40 | 11.1 | 17.4 | 19.7 | 15 |
| 14C6 | Powell R. S. | 4230 | 3/24 | 35 | 12.0 | 11.4 | - | - |
| 14C4 | Savage Pass | 6600 | 3/25 | 60 | 21.2 | 29.4 | 30.3 | 14 |
| 13C3 | Skalkaho Summit | 7259 | 3/23 | 55 | 18.0 | 28.4 | 28.2 | 15 |
| 14C8 | Twin Lakes | 6510 | 3/29 | 87 | 32.8 | - | - | - |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MARIAS, TETON, & SUN RIVER BASINS

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Marias, Teton and Sun River basins is FAIR to POOR.

Snow Surveys made at eleven (11) snow courses in the headwaters of these river basins on or about April first indicate that this year's snow-pack is 53 percent of last year's and only 50 percent of the 1943-57 average. Warm weather during the last two weeks of March removed most of the low elevation snow.

Fall precipitation was above normal and soil beneath the snow-pack and the soil in the valleys is well saturated. This should produce more than usual runoff. Base flow has been exceptionally high all winter.

Streamflow forecasts, comparisons with last year and averages are shown in detail on Page 3 of this report.

Reservoir storage is GOOD for the first of April.

The Sun River above Gibson Reservoir is forecast to flow 448,000 acre feet from April through September, or only 59 percent of last year and 78 percent of the 1943-57 average flow.

The Marias River is forecast to flow 475,000 acre feet of water during the April-September period, or 72 percent average.

*Report Prepared by*

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,502.1

LEGEND

- 13E2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- 0125 STREAM GAGING STATION
- DRAINAGE
- S C D BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

SCALE 10 0 10 20 30 40 MILES



5,L-16,502.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED VI

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR | NORMAL |
| | MARIAS RIVER | | | | | |
| 0995 | Shelby (near) | Apr-Sept | 475 | 72 | 464# | 659 |
| | | Apr-July | 444 | 74 | 424# | 605 |
| | N.FORK OF N.FORK SUN | | | | | |
| 0785 | Augusta (near) | Apr-Sept | 195 | 82 | 293 | 239 |
| | | Apr-July | 182 | 82 | 271 | 222 |
| | SUN RIVER | | | | | |
| 0786 | Gibson Dam (at) | Apr-Sept | 448 | 78 | 749 | 574 |
| | | Apr-July | 410 | 78 | 689 | 526 |

(#) 1958 data; 1959 data not available.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| 1013 | Tiber | 1316.0 | 666.3 | 696.5 | - |
| 0955 | Lake Francis | 112.0 | - | 96.6 | 96.0 |
| 0805 | Pishkun | 32.0 | 21.6 | 19.4 | 18.6 |
| 0795 | Gibson | 105.0 | 79.5 | 61.9 | 66.4 |
| 0820 | Willow Creek | 32.3 | 18.5 | 28.7 | 20.2 |
| 0940 | Swift | 30.0 | - | 30.1 | 24.7 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN, NEBR. 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED VI

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 12B8 | Benchmark | 5500 | 3/29 | 9 | 3.7 | 8.8 | 11.2 | 9 |
| 12B6 | Cabin Creek | 5400 | 4/3 | 7 | 3.4 | 10.1 | 7.5 | 9 |
| 12B9 | Five Bull | 5600 | 3/29 | 6 | 2.0 | 8.5 | 8.4 | 9 |
| 12A1 | Freight Creek | 6000 | 3/28 | 28 | 8.8 | 20.4 | 18.6 | 10 |
| 12B5 | Gates Park | 5300 | 4/3 | 17 | 6.3 | 13.9 | 11.7 | 9 |
| 12B7 | Goat Mountain | 7000 | 3/31 | 26 | 6.0 | 15.4 | 12.4 | 15 |
| 13A5M | Marias Pass | 5250 | 4/2 | 37 | 12.5 | 21.1 | 20.3 | 15 |
| 12B2 | Waldron Creek | 5600 | 3/28 | 0 | 0 | 7.7 | 8.4 | 10 |
| 12B1 | West Fork | 6000 | 3/28 | 21 | 8.6 | 16.8 | 19.4 | 10 |
| 12B4 | Wrong Creek | 5700 | 4/3 | 26 | 10.3 | 19.7 | 16.8 | 9 |
| 12B3 | Wrong Ridge | 6800 | 4/3 | 46 | 17.3 | 26.1 | 24.2 | 9 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MISSOURI RIVER (MAIN STEM) BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Missouri Main Stem from Toston to Fort Peck is forecast at 80 percent of the 1943-57 average flow. This forecast is only 5 to 10 percent less than last year's flow.

Detail forecast data is listed on Page 3 of this report for the major stream gaging stations along the river.

Small unmeasured streams may not reflect this high percentage of flow, due to the warm weather that melted much of the low elevation snow. These small streams should flow about 35 percent less water than last season.

Generally, reservoir storage is GOOD.

Soil moisture is high for the first of April.

*Report Prepared by*

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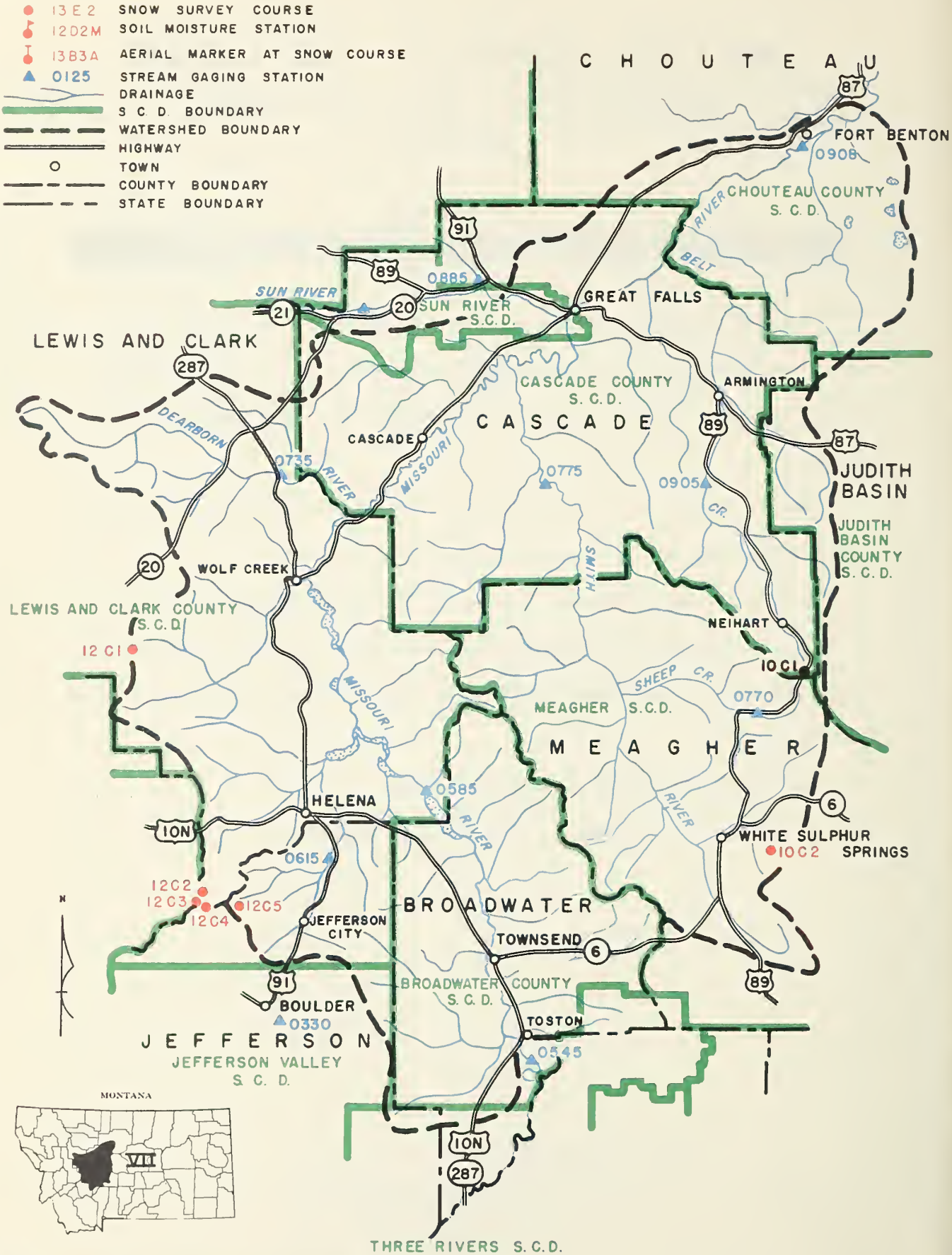
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,400.1


LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S C D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
CHOUTEAU
FORT BENTON
0908
CHOUTEAU COUNTY S. C. D.
RIVER
BELT
GREAT FALLS
0885
SUN RIVER
SUN RIVER S.C.D.
LEWIS AND CLARK
CASCADE COUNTY S. C. D.
CASCADE
ARMINGTON
DEARBORN
0735
RIVER
MISSOURI
0775
0905
CR.
JUDITH BASIN
JUDITH BASIN COUNTY S. C. D.
WOLF CREEK
HILLS
LEWIS AND CLARK COUNTY S. C. D.
12C1
NEIHART
10C1
SHEEP CR.
0770
MEAGHER S.C.D.
MEAGHER
MISSOURI
HELENA
0585
RIVER
WHITE SULPHUR SPRINGS
10C2
0615
12C2
12C3
12C4
12C5
JEFFERSON CITY
BROADWATER
TOWNSEND
BROADWATER COUNTY S. C. D.
BOULDER
0330
TOSTON
0545
JEFFERSON
JEFFERSON VALLEY S. C. D.
MONTANA
VII
THREE RIVERS S. C. D.
SCALE 10 0 10 20 30 40 MILES

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED VII

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | MISSOURI RIVER | | | | | |
| 0545 | Toston (at) (3) | Apr-Sept | 1896 | 81 | 1991 | 2342 |
| | | Apr-July | 1649 | 81 | 1726 | 2030 |
| 0908 | Fort Benton (at) (5) | Apr-Sept | 2955 | 82 | 3138 | 3599 |
| | | Apr-July | 2526 | 82 | 2654 | 3076 |
| 1095 | Virgelle (at) (6) | Apr-Sept | 3542 | 81 | 4001 | 4393 |
| | | Apr-July | 3071 | 81 | 3431 | 3803 |
| 1150 | Zortman (near) (6) | Apr-Sept | 3895 | 81 | 4574 | 4806 |
| | | Apr-July | 3359 | 81 | 3919 | 4143 |
| 1320 | Ft. Peck Dam (below)(7) | Apr-Sept | 3807 | 80 | 4085 | 4761 |
| | | Apr-July | 3352 | 80 | 3588 | 4181 |
| 1770 | Wolf Point (near) (7) | Apr-Sept | 4169 | 79 | 4264 | 5261 |
| | | Apr-July | 3696 | 79 | 3741 | 4652 |
| 3300 | Williston, N. D. (8) | Apr-Sept | 8973 | 71 | 10729 | 12562 |
| | | Apr-July | 7878 | 71 | 10136 | 11101 |
| | PRICKLY PEAR CREEK | | | | | |
| 0615 | Clancy (near) | Apr-Sept | 24.7 | 103 | 18.1 | 23.9 |
| | | Apr-July | 21.2 | 101 | 15.9 | 20.8 |

(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(5) Observed flow plus change in storage in Canyon Ferry.
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs.
(8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 0585 | Canyon Ferry | 2043.0 | 1774.0 | 1774.0 | 1328.0 |
| 0645 | Lake Helena | 10.4 | 7.6 | 7.6 | 5.3 |
| 0660 | Holter Lake | 81.9 | 51.8 | 51.8 | 54.3 |
| 0650 | Hauser Lk. & Lk.Helena | 61.9 | 53.6 | 53.6 | 43.8 |
| 1315 | Fort Peck | 19410.0 | 11360.0 | 9637.0 | 11606.0 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN, NEBR 1960



5,L-16,395.1

# SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED VII

| SNOW COURSE NO. | SNOW COURSE NAME | ELEVATION | CURRENT INFORMATION: DATE OF SURVEY | CURRENT INFORMATION: SNOW DEPTH (Inches) | CURRENT INFORMATION: WATER CONTENT (Inches) | PAST RECORD: WATER CONTENT (Inches) LAST YEAR | PAST RECORD: WATER CONTENT (Inches) AVERAGE | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| 12C5 | Chessman Reservoir | 6200 | 3/31 | 6 | 1.6 | 6.0 | 5.1 | 15 |
| 10C2 | Grasshopper | 7000 | 3/31 | 16 | 3.6 | 6.4 | 5.6 | 15 |
| 10C1 | Kings Hill | 7950 | 4/1 | 42 | 11.9 | 16.6 | 13.8 | 15 |
| 12C1 | Stemple Pass | 6900 | 4/1 | 29 | 8.2 | 15.1 | 11.0 | 15 |
| 12C2 | Ten Mile, Lower | 6250 | 4/3 | 13 | 4.1 | 7.9 | 7.2 | 14 |
| 12C3 | Ten Mile, Middle | 6800 | 4/2 | 29 | 9.1 | 11.8 | 11.3 | 15 |
| 12C4 | Ten Mile, Upper | 8000 | 4/2 | 37 | 12.0 | 16.1 | 14.4 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## BEAVERHEAD, & JEFFERSON RIVER BASINS

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Survey measurements made in the Beaverhead and Jefferson River basin on or about April first indicate the water stored in the snow-pack is 72 percent of last year and 63 percent of the 1943-57 average. A decrease in water content from March first was noted at about one-third of the snow courses in the drainage.

Streamflow is forecast to be about 30 percent below average in the upper reaches of the Beaverhead drainage and 10 percent below average for the Big Hole and Jefferson Rivers. Fall precipitation was above average; base flow in the streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack. Streamflow is expected to be slightly higher than last year; however, if the current trend of above normal temperatures continues, the majority of the runoff will occur much earlier than last year. Below normal precipitation in the summer months could result in a short water supply during the heavy irrigation period.

*Report Prepared by*

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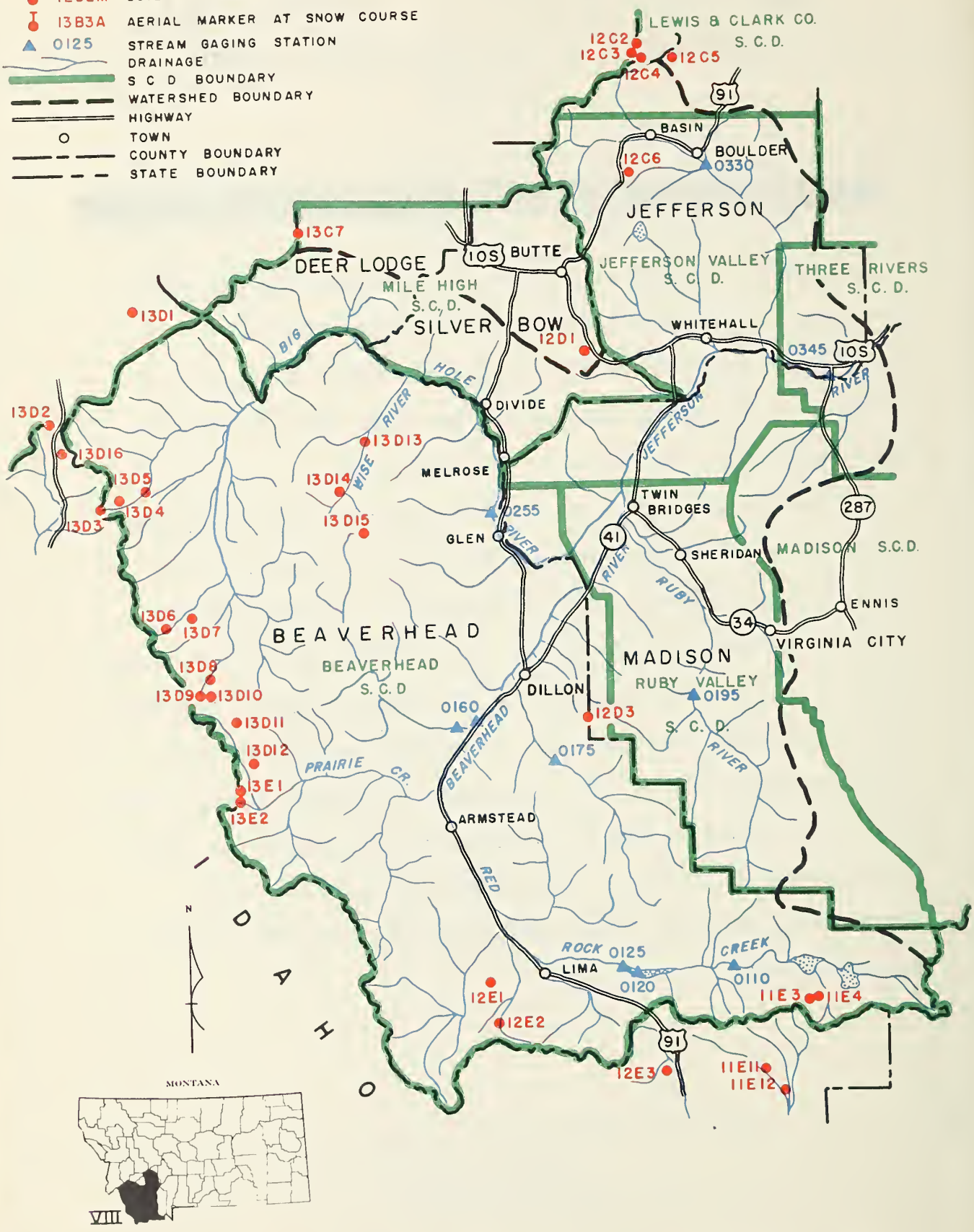
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,394.1


LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S C D BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
LEWIS & CLARK CO. S. C. D.
12C2
12C3
12C4
12C5
91
BASIN
BOULDER
0330
12C6
JEFFERSON
13C7
DEER LODGE
10S
BUTTE
JEFFERSON VALLEY S. C. D.
THREE RIVERS S. C. D.
MILE HIGH S. C. D.
13D1
SILVER BOW
12D1
WHITEHALL
0345
10S
BIG HOLE RIVER
DIVIDE
JEFFERSON RIVER
13D2
13D16
13D5
13D4
13D3
13D13
13D14
13D15
WISE RIVER
MELROSE
0255
TWIN BRIDGES
287
GLEN
41
SHERIDAN
MADISON S.C.D.
RUBY RIVER
ENNIS
34
VIRGINIA CITY
13D6
13D7
13D8
13D9
13D10
13D11
13D12
13E1
13E2
BEAVERHEAD
BEAVERHEAD S. C. D
DILLON
MADISON
RUBY VALLEY
0195
S. C. D.
0160
12D3
0175
PRAIRIE CR.
BEAVERHEAD RIVER
ARMSTEAD
RED
ROCK
0125
CREEK
LIMA
0120
0110
11E3
11E4
12E1
12E2
91
12E3
11E11
11E12
IDAHO
N
MONTANA
VIII
SCALE 10 0 10 20 30 40 MILES
USDA SCS LINCOLN NEBR 960



5,L-16,394.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED VIII

(1000 Acre Feet)

| FORECAST POINT | | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + | |
|---|---|---|---|---|---|---|
| NO. | NAME | | | | LAST YEAR | NORMAL |
| | RED ROCK RIVER | | | | | |
| 0110 | Kennedy Ranch (at) | May-Sept | 32.9 | 60 | 34.1 | 54.9 |
| | | May-July | 29.5 | 60 | 28.8 | 49.1 |
| 0125 | Monida (near) (1) | Apr-Sept | 59.6 | 69 | 53.6 | 86.4 |
| | | Apr-July | 55.8 | 68 | 49.1 | 82.2 |
| | BEAVERHEAD RIVER | | | | | |
| 0160 | Barratts (at) (1) | Apr-Sept | 121 | 70 | 90 | 173 |
| | | Apr-July | 107 | 69 | 68 | 155 |
| | BIG HOLE RIVER | | | | | |
| 0255 | Melrose (near) | Apr-Sept | 701 | 91 | 644 | 770 |
| | | Apr-July | 657 | 92 | 592 | 714 |
| | BOULDER RIVER | | | | | |
| 0330 | Boulder (near) | Apr-Sept | 72.7 | 91 | 67.5 | 79.9 |
| | | Apr-July | 69.7 | 92 | 64.8 | 76.5 |
| | JEFFERSON RIVER | | | | | |
| 0345 | Sappington (at) | Apr-Sept | 977 | 91 | 835 | 1074 |
| | | Apr-July | 880 | 92 | 750 | 958 |

(1) Observed flow plus change in storage in Lima Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED | | |
|---|---|---|---|---|---|
| | | | THIS YEAR | LAST YEAR | NORMAL |
| 0120 | Lima | 84.0 | 28.9 | 30.4 | 33.9 |
| | Ruby | 38.8 | 32.4 | - | 25.9 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED VIII

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | WATER CONTENT (Inches) | | |
| NO. | NAME | ELEVATION | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | LAST YEAR | AVERAGE | YEARS OF RECORD |
| 13D14 | Anderson Meadow | 7000 | 3/22 | 19 | 5.1 | 6.6 | 9.2 | 10 |
| 13D4 | Below Big Hole Pass | 6900 | 3/23 | 37 | 9.9 | 14.2 | 15.9 | 10 |
| 13D3 | Big Hole Pass | 7240 | 3/23 | 40 | 10.7 | 15.8 | 19.0 | 10 |
| 13D10 | Bloody Dick | 7600 | 3/24 | 30 | 8.3 | 10.8 | 12.7 | 10 |
| 11E11 | Blue Ledge Mine | 6700 | 3/29 | 31 | 8.4 | 12.2 | 17.2 | 15 |
| 12E3 | Camp Creek | 6800 | 3/30 | 21 | 5.8 | 8.5 | 10.4 | 15 |
| 12C5 | Chessman Reservoir | 6200 | 3/31 | 6 | 1.6 | 6.0 | 5.1 | 15 |
| 13D5 | East Boundary | 6700 | 3/23 | 16 | 4.2 | 8.1 | 9.5 | 10 |
| 13D15 | Elk Horn | 8450 | 3/30 | 26 | 6.6 | 10.3 | 10.7 | 15 |
| 13D2 | Gibbons Pass | 7100 | 3/31 | 52 | 16.6 | 23.5 | 25.7 | 15 |
| 13D9 | Gold Stone | 8100 | 3/24 | 38 | 11.3 | 14.0 | 16.7 | 10 |
| 13D8 | Jahnke Creek | 7340 | 3/24 | 29 | 8.1 | 10.0 | 12.5 | 10 |
| 11E12 | Kilgore | 6200 | 3/29 | 20 | 6.4 | 8.8 | 10.3 | 15 |
| 11E4 | Lakeview Canyon | 6930 | 3/31 | 26 | 7.3 | 8.3 | 10.9 | 10 |
| 11E3 | Lakeview Ridge | 7400 | 3/31 | 22 | 5.4 | 6.6 | 10.0 | 10 |
| 13E1 | Lemhi Pass | 7480 | 3/27 | 23 | 6.8 | 8.7 | 10.0 | 10 |
| 12E2 | Limekiln | 6950 | 3/28 | 0 | 0 | 0 | 1.7 | 10 |
| 13D6 | Miner Forks | 7300 | 3/25 | 35 | 9.2 | 13.2 | 13.8 | 10 |
| 13D7 | Miner Lake | 6720 | 3/25 | 26 | 6.5 | 10.8 | 9.1 | 13 |
| 13D16 | Moose Creek | 6200 | 3/25 | 39 | 12.7 | 14.5 | 18.3 | 15 |
| 12C6 | Picnic Grounds | 6500 | 4/1 | 10 | 2.6 | 4.5 | 4.5 | 12 |
| 12D1 | Pipestone Pass | 7200 | 3/31 | 19 | 5.6 | 6.2 | 6.0 | 15 |
| 13D11 | Selway Junction | 6800 | 3/29 | 19 | 5.6 | 7.0 | 9.7 | 10 |
| 13C7 | Storm Lake | 7780 | 3/22 | 38 | 11.3 | 15.6 | 15.6 | 15 |
| 12C2 | Ten Mile, Lower | 6250 | 4/3 | 13 | 4.1 | 7.9 | 7.2 | 14 |
| 12C3 | Ten Mile, Middle | 6800 | 4/2 | 29 | 9.1 | 11.8 | 11.3 | 15 |
| 12C4 | Ten Mile, Upper | 8000 | 4/2 | 37 | 12.0 | 16.1 | 14.4 | 15 |
| 13D12 | Terrell Creek | 6650 | 3/29 | 2 | 0.9 | 5.1 | 5.1 | 10 |
| 13E2 | Trail Creek | 7090 | 3/27 | 26 | 7.8 | 7.8 | 9.4 | 10 |
| 11E1 | White Pine Ridge | 8850 | 3/28 | 12 | 3.0 | 3.6 | 6.4 | 10 |
| 13D13 | Wise River | 6300 | 3/22 | 15 | 3.8 | 4.4 | 5.9 | 10 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## MADISON, & GALLATIN RIVER BASINS

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Madison and Gallatin drainages is only FAIR. Snow Surveys made near the first of April indicate that water stored in the snow is about 30 percent less than last year and 62 percent of the 1943-57 average.

The Madison River near West Yellowstone is forecast to flow 153,000 acre feet during the April through September period, or 20 percent less than last year. The West Gallatin River near Gateway is expected to produce only 75 percent of last year during the April through September period. Hyalite Creek has the best outlook for near normal runoff with 34,700 acre feet forecast for the April through September period.

Soil moisture is much above normal with most soil in the area being almost saturated.

*Report Prepared by*

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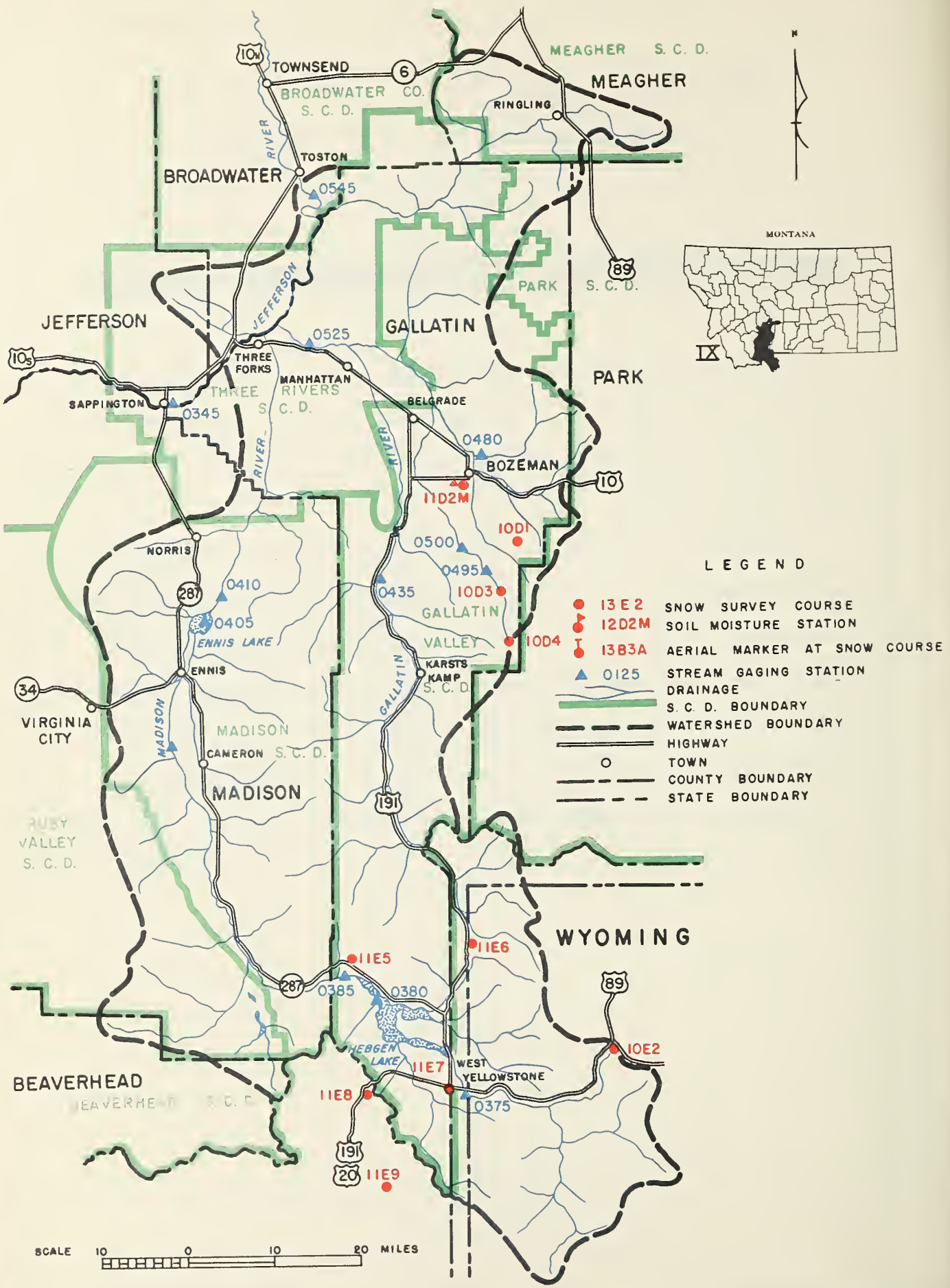
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,521.1




USDA-SCS-LINCOLN, NEBR. 1960



5,L-16,521.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED IX

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | MADISON RIVER | | | | | |
| 0375 | West Yellowstone (nr) | Apr-Sept | 153 | 71 | 192 | 216 |
| | | Apr-July | 112 | 68 | 137 | 165 |
| 0385 | Grayling (near) (2) | Apr-Sept | 318 | 71 | 366 | 448 |
| | | Apr-July | 242 | 68 | 271 | 357 |
| 0410 | McAllister (near) (3) | Apr-Sept | 567 | 75 | 679 | 756 |
| | | Apr-July | 444 | 72 | 526 | 613 |
| | WEST GALLATIN RIVER | | | | | |
| 0435 | Gateway (near) | Apr-Sept | 377 | 82 | 506 | 459 |
| | | Apr-July | 320 | 81 | 418 | 395 |
| 0500 | Hyalite Cr. R.S.(at)(4) | Apr-Sept | 34.7 | 96 | 44.6 | 36.1 |
| | | Apr-July | 29.2 | 94 | 39.1 | 31.0 |
| | EAST GALLATIN RIVER | | | | | |
| 0480 | Bozeman (at) | Apr-Sept | 34.7 | 75 | 50.6 | 46.4 |
| | | Apr-July | 30.8 | 75 | 44.3 | 40.7 |
| | GALLATIN RIVER | | | | | |
| 0525 | Logan (at) | Apr-Sept | 366 | 74 | 514 | 492 |
| | | Apr-July | 304 | 72 | 441 | 422 |

(2) Observed flow plus change in storage in Hebgen Lake.
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(4) Observed flow plus change in storage in Hyalite Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 0380 | Hebgen Lake | 345.0 | 8.9 | 167.6 | 208.3 |
| 0405 | Ennis Lake | 41.0 | 38.2 | 38.4 | 35.3 |
| 0500 | Middle Creek | 8.0 | 4.4 | 4.3 | 4.0 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)



USDA SCS LINCOLN NEBR 1960

5,L-16,395.1

# SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED IX

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 11E9 | Big Springs | 6500 | 3/31 | 34 | 11.0 | 16.9 | 23.5 | 15 |
| 10D4 | Devil's Slide | 8100 | 4/2 | 77 | 23.0 | 28.0 | 21.2 | 15 |
| 11E5 | Hebgen | 6550 | 3/23 | 27 | 7.6 | 11.3 | 12.6 | 15 |
| 10D3 | Hood Meadow | 6600 | 4/1 | 28 | 7.9 | 11.4 | 9.8 | 15 |
| 11E10 | Island Park | 6315 | 3/31 | 30 | 8.9 | 13.7 | 17.8 | 15 |
| 10D1 | New World | 6700 | 3/30 | 30 | 9.2 | 13.4 | 10.6 | 15 |
| 10E2 | Norris Basin | 7500 | 3/31 | 25 | 6.6 | 8.5 | 10.3 | 12 |
| 10D10 | Sacajawea | 6550 | 3/24 | 39 | 12.5 | - | - | - |
| 11E6 | Twenty-One Mile | 7150 | 3/25 | 30 | 8.8 | 15.8 | 19.2 | 15 |
| 11E8 | Valley View | 6500 | 3/31 | 32 | 8.0 | 13.8 | 16.4 | 15 |
| 11E7 | West Yellowstone | 6700 | 3/24 | 19 | 5.4 | 9.2 | 12.7 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR '960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## JUDITH, & MUSSELSHELL RIVER BASINS

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Judith and Musselshell River basins is GOOD. Snow Surveys made near the first of April indicate that water stored in the snow-pack is 74 percent of last year and is 86 percent of the 1943-57 average.

Streamflow in the Judith and Musselshell drainages is forecast to be near average during the April through September period. Above normal fall precipitation, high flows during the fall and winter months, and above normal soil moisture should produce more runoff than would normally be expected from the water presently stored in the snow-pack.

*Report Prepared by*

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BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,516.1

USDA-SCS-LINCOLN NEBR 1960



5,L-16,516.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED X

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | MUSSELSHELL RIVER | | | | | |
| | South Fork | | | | | |
| 1185 | Martinsdale (above) | Apr-Sept | 54.7 | 102 | 25.6# | 53.6 |
| | | Apr-July | 52.8 | 103 | 24.2# | 51.4 |
| 1205 | Harlowton (at) (9) | Apr-Sept | 85 | 102 | 34.5# | 83.0 |
| | | Apr-July | 84 | 102 | 33.9# | 82.0 |
| | MISSOURI RIVER | | | | | |
| 1095 | Virgelle (at) (6) | Apr-Sept | 3542 | 81 | 4001 | 4393 |
| | | Apr-July | 3071 | 81 | 3431 | 3803 |
| 1150 | Zortman (near) (6) | Apr-Sept | 3895 | 81 | 4574 | 4806 |
| | | Apr-July | 3359 | 81 | 3919 | 4143 |

(9) Observed flow plus change in storage in Durand Reservoir and Martinsdale Reservoirs.
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 1165 | Durand | 7.0 | - | 5.6 | 5.3 |
| 1105 | Ackley | 5.8 | 4.1 | - | 4.3 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960 WATERSHED X

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 9C1 | Crystal Lake | 6100 | 3/15 | 50 | 14.4 | 16.8 | 11.8 | 15 |
| 10C2 | Grasshopper | 7000 | 3/31 | 16 | 3.6 | 6.4 | 5.6 | 15 |
| 10C1 | Kings Hill | 7950 | 4/1 | 42 | 11.9 | 16.6 | 13.8 | 15 |
| 10C3 | Porcupine | 6500 | 4/4 | 18 | 5.0 | 7.3 | 6.8 | 15 |
| 9A1 | Rocky Boy | 5200 | 3/31 | 5 | 2.1 | 3.2 | 5.2 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960



5,L-16,395.2

# WATER SUPPLY OUTLOOK

## UPPER YELLOWSTONE RIVER BASIN

## MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Upper Yellowstone River basin is only FAIR. Snow Survey measurements made near the first of April indicate the water stored in the snow-pack is 63 percent of last year and 65 percent of the 1943-57 average.

The Yellowstone River at Corwin Springs is forecast to flow 1,312,000 acre feet or about 25 percent less than last year during the April through September period.

The Clarks Fork River is expected to flow about 35 percent less than last year and the Stillwater River about 20 percent below average. The Shields River is forecast to flow about 40 percent above average. This forecast is based on the above normal fall precipitation, high stream flow during the fall and winter months, and above normal soil moisture.

*Report Prepared by*

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SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



USDA SCS LINCOLN NEBR 1960

5,L-16,510.1

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5,L-16,510.2

# WATER SUPPLY FORECASTS

## AS OF APRIL 1, 1960 - WATERSHED XI

(1000 Acre Feet)

| FORECAST POINT NO. | FORECAST POINT NAME | FORECAST PERIOD | FORECAST THIS YEAR | % NORMAL | MEASURED + LAST YEAR | MEASURED + NORMAL |
|---|---|---|---|---|---|---|
| | YELLOWSTONE RIVER | | | | | |
| 1915 | Corwin Springs (at) | Apr-Sept | 1312 | 66 | 1785 | 1980 |
| | | Apr-July | 1059 | 64 | 1499 | 1649 |
| 1925 | Livingston (near) | Apr-Sept | 1448 | 64 | 1630# | 2252 |
| | | Apr-July | 1145 | 61 | 1368# | 1863 |
| 2145 | Billings (at) | Apr-Sept | 2953 | 69 | 4094 | 4261 |
| | | Apr-July | 2494 | 68 | 3608 | 3657 |
| 3090 | Miles City (at)(13) | Apr-Sept | 4491 | 67 | 5238 | 6707 |
| | | Apr-July | 3923 | 67 | 4731 | 5884 |
| 3295 | Sidney (near) (13) | Apr-Sept | 4488 | 65 | 4760 | 6921 |
| | | Apr-July | 3948 | 64 | 4393 | 6137 |
| | SHIELDS RIVER | | | | | |
| 1935 | Clyde Park (at) | Apr-Sept | 158 | 142 | 50.0# | 111 |
| | | Apr-July | 143 | 139 | 46.6# | 103 |
| | ROSEBUD CREEK | | | | | |
| 2045 | Absarokee (near) (12) | Apr-Sept | 239 | 89 | 252# | 267 |
| | | Apr-July | 192 | 89 | 202# | 216 |
| | STILLWATER RIVER | | | | | |
| 2050 | Absarokee (near) (12) | Apr-Sept | 502 | 81 | 530# | 620 |
| | | Apr-July | 424 | 81 | 445# | 523 |
| | CLARKS FORK RIVER | | | | | |
| 2075 | Chance (at) | Apr-Sept | 430 | 70 | 648 | 617 |
| | | Apr-July | 393 | 71 | 601 | 552 |
| 2085 | Edgar (at) | Apr-Sept | 464 | 71 | 652 | 652 |
| | | Apr-July | 419 | 73 | 589 | 575 |
| | ROCK CREEK | | | | | |
| 2095 | Red Lodge (near) | Apr-Sept | 103 | 92 | 97.5# | 112 |
| | | Apr-July | 79.4 | 92 | 75.4# | 86.3 |

(12) Observed flow plus change in storage in Mystic Lake.
(13) Observed flow plus change in storage in Buffalo Bill and Boysen Reservoir.
( +) Provisional data furnished by U. S. Geological Survey.
( #) 1958 data; 1959 data not available.

# RESERVOIR STORAGE DATA

## AS OF MARCH 31, 1960

(1000 Acre Feet)

| NO. | RESERVOIR | USABLE CAPACITY | MEASURED THIS YEAR | MEASURED LAST YEAR | MEASURED NORMAL |
|---|---|---|---|---|---|
| 2040 | Mystic Lake | 20.8 | 5.0 | 4.2 | 5.7 |

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

# SNOW SURVEY DATA

AS OF APRIL 1, 1960 WATERSHED XI

| SNOW COURSE | | | CURRENT INFORMATION | | | PAST RECORD | | |
|---|---|---|---|---|---|---|---|---|
| | | | DATE OF SURVEY | SNOW DEPTH (Inches) | WATER CONTENT (Inches) | WATER CONTENT (Inches) | | YEARS OF RECORD |
| NO. | NAME | ELEVATION | | | | LAST YEAR | AVERAGE | |
| 9D1 | Camp Senia | 7890 | 3/17 | 23 | 5.0 | 7.0 | 7.3 | 15 |
| 10E3 | Canyon | 7500 | 4/1 | 32 | 8.7 | 15.0 | 16.0 | 15 |
| 10D7 | Cooke City | 7400 | 3/31 | 20 | 5.5 | 9.4 | 9.5 | 15 |
| 10D5 | Crevice Mountain | 8400 | 4/1 | 18 | 3.9 | 8.5 | 10.5 | 15 |
| 10D4 | Devil's Slide | 8100 | 4/2 | 77 | 23.0 | 28.0 | 21.2 | 15 |
| 10E6 | East Entrance | 7000 | 3/31 | 18 | 4.8 | 11.2 | 13.0 | 9 |
| 10D3 | Hood Meadow | 6600 | 4/1 | 28 | 7.9 | 11.4 | 9.8 | 15 |
| 10D6 | Independence | 8000 | 3/16 | 50 | 12.2 | 19.6 | 20.1 | 12 |
| 10E4 | Lake Camp | 7850 | 3/31 | 28 | 5.6 | 9.6 | 12.8 | 14 |
| 9E1 | Lodgepole | 8200 | 3/30 | 24 | 6.3 | 11.8 | 12.3 | 13 |
| 10E1 | Lupine Creek | 7300 | 4/1 | 23 | 6.7 | 9.4 | 11.9 | 14 |
| 10D1 | New World | 6700 | 3/30 | 30 | 9.2 | 13.4 | 10.6 | 15 |
| 10E2 | Norris Basin | 7500 | 3/31 | 25 | 6.6 | 8.5 | 10.3 | 12 |
| 10C3 | Porcupine | 6500 | 4/4 | 18 | 5.0 | 7.3 | 6.8 | 15 |
| 10D10 | Sacajawea | 6550 | 3/24 | 39 | 12.5 | - | - | - |
| 10E5 | Sylvan Pass | 7100 | 3/30 | 29 | 8.2 | 15.9 | 16.5 | 14 |
| 10E7 | Thumb Divide | 7900 | 3/30 | 43 | 11.8 | 19.8 | 25.8 | 15 |

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960



5,L-16,395.2

## STATUS OF RESERVOIR STORAGE

March 31, 1960

| BASIN & STREAM | RESERVOIR | USABLE CAPACITY 1000 A.F. | USABLE STORAGE - 1000 ACRE FEET | | | |
|---|---|---|---|---|---|---|
| | | | 1960 | 1959 | 1943-57 Average | Yrs. |
| **MISSOURI RIVER BASIN - WYOMING** | | | | | | |
| Shoshone River | Buffalo Bill | 380.3 | 128.0 | 13.6 | 220.6 | 15 |
| Wind River | Boysen | 560.0AC | 139.6 | 100.1 | 426.7** | 5 |
| Wind River | Pilot Butte | 31.6 | 26.0 | 12.1 | 18.2 | 15 |
| Bull Creek | Bull Lake | 152.0 | 36.6 | 45.5 | 60.1 | 15 |
| Belle Fourche | Key Hole | 190.0AC | 14.8 | 4.7 | 11.7** | 6 |
| **MISSOURI RIVER BASIN - NORTH DAKOTA** | | | | | | |
| Heart River | Lake Tschida | 68.7AC | 7.5 | 78.3 | 65.3** | 7 |
| Heart River | E. A. Patterson | 5.6AC | 5.9 | 5.8 | 5.4** | 7 |
| Missouri River | Garrison Lake | 18100.0AC | 5020.9 | 3965.9 | - | - |
| James River | Jamestown | 220.0AC | 10.4 | 11.4 | - | - |
| **MISSOURI RIVER BASIN - SOUTH DAKOTA** | | | | | | |
| Belle Fourche | Belle Fourche | 185.2AC | - | 58.2 | 116.9 | 15 |
| Cheyenne River | Angostura | 90.0AC | - | 50.6 | 47.2** | 6 |
| Cheyenne River | Deerfield | 15.1AC | - | 9.3 | 13.3** | 10 |
| Grand River | Shadehill | 84.0AC | - | 86.0 | 81.1** | 5 |
| Missouri River | Ft. Randall | 3800.0AC | 3222.0 | 2979.0 | 1736.3** | 3 |
| Missouri River | Gavins Point | 320.0AC | 4027.0 | 306.4 | - | - |
| Missouri River | Oahe | 17000.0AC | - | 751.0T | - | - |
| Cheyenne River | Pactola | 55.0AC | - | 19.4 | - | - |

** Average for years of record shown in 1943-57 period.
AC Active Capacity; USBR Billings.
T Total Storage.

# WYOMING SNOW SURVEYS ABOUT APRIL 1, 1960

| No. | Snow Course Name | Elev. | Current Information: Date of Survey | Snow Depth (In.) | Water Content (In.) | Past Record: Water Content (In.) Last Year | 15-Year Average 1943-57 | Years Record Used In Average |
|---|---|---|---|---|---|---|---|---|
| **LOWER YELLOWSTONE - WIND RIVER** | | | | | | | | |
| 9F12 | Big Warm | 8800 | 3/26 | 25 | 7.1 | 8.9 | 9.5** | 5 |
| 9F4 | Burroughs Creek | 8800 | 3/28 | 28 | 7.8 | 14.4 | 15.6** | 11 |
| 9F10 | Dinwoodie | 10000 | 3/29 | 36 | 9.2 | 11.6 | 13.7** | 10 |
| 9F9 | Dry Creek | 9500 | 3/29 | 17 | 4.3 | 6.8 | 7.3** | 10 |
| 9F6 | DuNoir | 8750 | 3/26 | 20 | 4.9 | 7.4 | 10.1 | 19 |
| 9F7 | Geyser Creek | 8500 | 3/27 | 17 | 3.9 | 6.6 | 8.8** | 11 |
| 9F8 | Little Warm | 9500 | 3/27 | 47 | 13.7 | 16.7 | 18.8** | 11 |
| 9F14 | Sheridan R.S. #2 | 7500 | 3/28 | 18 | 5.0 | 6.4 | 7.3** | 5 |
| 9F3 | T-Cross Ranch | 8000 | 3/28 | 11 | 2.9 | 6.2 | 8.1 | 19 |
| #10F9 | Togwotee Pass | 9600 | 3/29 | 74 | 24.6 | 32.2 | 32.1 | 24 |
| **LOWER YELLOWSTONE - POPO AGIE RIVER** | | | | | | | | |
| 8G2 | Blue Ridge | 9500 | 3/23 | 25 | 6.9 | 9.8 | 13.8 | 20 |
| 8G5 | Bruce's Camp | 6500 | 3/24 | 12 | 4.3 | N.R. | | 3 |
| 9G3 | Hobbs Park | 10000 | 3/31 | 43 | 12.9 | 15.7 | 19.4** | 11 |
| 9G4 | Mosquito Park R.S. | 9500 | 3/31 | 20 | 5.7 | 7.0 | 8.8** | 15 |
| 5G1 | Sawmill Glade | 8500 | 3/23 | 25 | 5.9 | 9.0 | 8.6 | 20 |
| #8G3 | South Pass | 9000 | 3/23 | 37 | 10.2 | 11.6 | 16.4 | 20 |
| 9F11 | St. Lawrence R.S. | 9000 | 3/26 | 13 | 3.3 | 6.2 | 7.6* | 16 |
| 9G2 | Trout Creek | 8400 | 3/31 | 12 | 3.2 | 7.8 | 6.6** | 11 |
| **LOWER YELLOWSTONE - OWL CREEK** | | | | | | | | |
| +#9F19 | Kirwin | 11000 | 4/5 | 55 | 16.5E | | | |
| 8F1 | Owl Creek | 8700 | 3/29 | 28 | 7.8 | 5.8 | 5.9** | 10 |
| **LOWER YELLOWSTONE - GREYBULL RIVER** | | | | | | | | |
| +#9F19 | Kirwin | 11000 | 4/5 | 55 | 16.5E | | | |
| 9F3 | Timber Creek #2 | 8800 | 3/30 | 16 | 4.7 | 3.6 | 3.4** | 11 |
| 9F15 | Wood River #2 | 8000 | 3/30 | 22 | 6.3 | 5.6 | 5.7* | 17 |
| **LOWER YELLOWSTONE - SHOSHONE RIVER** | | | | | | | | |
| 9E4 | Carter Mountain | 7800 | 3/31 | 18 | 5.2 | 4.8 | | 3 |
| #10E6 | East Entrance | 7000 | 3/31 | 18 | 4.8 | 11.2 | 12.8**e | 11 |
| +9E5 | Ishawooa | 9200 | 4/5 | 133 | | | | |
| #10E5 | Sylvan Pass | 7100 | 3/30 | 29 | 8.2 | 15.9 | 15.9* | 21 |
| 10F9 | Togwotee Pass | 9600 | 3/29 | 74 | 24.6 | 32.2 | 32.1 | 24 |
| +9F18 | Younts Peak | 8500 | 4/5 | 89 | 31.0E | | | |

* Average is for 15 years of data within and adjacent to the 1943-57 period.
** Average of all past data.
# Adjacent drainage.
\+ Aerial stadia marker.
e Partial estimate during the 1943-57 base period; E Estimated Water Content.

# WYOMING SNOW SURVEYS ABOUT APRIL 1, 1960

| No. | Snow Course Name | Elev. | Current Information: Date of Survey | Snow Depth (In.) | Water Content (In.) | Past Record: Water Content (In.) Last Year | 15-Year Average 1943-57 | Years Record Used In Average |
|---|---|---|---|---|---|---|---|---|
| **LOWER YELLOWSTONE - NOWOOD CREEK** | | | | | | | | |
| #7F1 | Bear Trap | 8000 | 3/25 | 23 | 6.2 | | | |
| #7F2 | Canyon Creek | 7400 | 3/26 | 37 | 10.0 | | | |
| 7E25 | Cold Springs Camp | 8700 | 3/24 | 23 | 5.8 | 10.2 | 8.1** | 4 |
| 7E24 | Medicine Lodge Lake | 9500 | 3/24 | 38 | 9.7 | 13.2 | 11.7** | 4 |
| #7E8 | Munkres Pass | 9700 | 4/1 | 32 | 8.3 | 10.4 | 9.3** | 9 |
| #7E27 | Onion Gulch | 8100 | 3/25 | 31 | 8.3 | 10.3 | 9.2** | 4 |
| 7E7 | Tensleep R.S. | 8300 | 3/28 | 26 | 7.1 | 10.2 | 7.3 | 22 |
| 7E35 | Tyrell R.S. | 8300 | 3/28 | 19 | 6.5 | 10.8 | 8.2** | 4 |
| 7E26 | West Tensleep Lake | 9075 | 3/28 | 37 | 9.9 | 13.9 | 11.7** | 4 |
| **LOWER YELLOWSTONE - SHELL CREEK** | | | | | | | | |
| 7E21 | Bald Mountain | 9600 | 3/28 | 64 | 20.7 | 26.4 | 19.8** | 4 |
| #7E20 | Beaver Tongue | 9200 | 3/28 | 59 | 18.3 | 25.7 | 18.8** | 4 |
| #7E18 | Bone Spring | 9200 | 3/30 | 55 | 16.0 | 21.0 | 16.9** | 4 |
| 7E22 | Granite Creek Camp | 7800 | 4/1 | T | 0 | 5.8 | 4.3** | 4 |
| #7E17 | Granite Pass | 8950 | 3/30 | 52 | 15.3 | 21.1 | 16.6** | 4 |
| 7E4 | Ranger Creek | 8800 | 4/1 | 25 | 6.9 | 11.9 | 9.0 | 22 |
| 7E23 | Shell Creek | 9600 | 4/1 | 54 | 13.7 | 16.6 | 15.1** | 4 |
| **LOWER YELLOWSTONE - PORCUPINE CREEK** | | | | | | | | |
| 7E31 | Five Springs Falls | 7500 | 4/1 | 20 | 5.4 | 6.5 | 5.8** | 4 |
| 7E30 | Medicine Wheel | 9000 | 3/28 | 50 | 16.1 | 23.8 | 16.0** | 4 |
| **LOWER YELLOWSTONE - TONGUE RIVER** | | | | | | | | |
| #7E20 | Beaver Tongue | 9200 | 3/28 | 59 | 18.3 | 25.7 | 18.8** | 4 |
| 7E32 | Big Goose #2 | 7700 | 4/2 | 26 | 6.3 | 10.4 | 7.9** | 4 |
| #7E18 | Bone Spring | 9200 | 3/30 | 55 | 16.0 | 21.0 | 16.9** | 4 |
| 7E33 | Burgess R.S. #2 | 7900 | 3/29 | 30 | 7.9 | 11.3 | 7.8** | 4 |
| 7E34 | Dome Lake #2 | 8800 | 4/2 | 39 | 9.7 | 11.6 | 10.0**e | 4 |
| 7E14 | Gloom Creek | 9300 | 3/31 | 51 | 14.8 | 17.0 | 12.9** | 4 |
| #7E17 | Granite Pass | 8950 | 3/30 | 52 | 15.3 | 21.1 | 16.6** | 4 |
| 7E11 | Sibley Lake | 8000 | 3/31 | 37 | 9.0 | 14.5 | 10.0** | 4 |
| 7E12 | Sucker Creek | 9000 | 3/31 | 45 | 12.4 | 16.2 | 12.0** | 4 |
| 7E10 | Steamboat Point | 7500 | 3/31 | 26 | 7.6 | 12.3 | 7.8** | 4 |
| 7E13 | Wood Rock G.S. | 8500 | 3/29 | 39 | 10.6 | 14.0 | 10.9** | 4 |
| **LOWER YELLOWSTONE - POWDER RIVER** | | | | | | | | |
| #7F1 | Bear Trap | 8000 | 3/25 | 23 | 6.2 | | | |
| #7F2 | Canyon Creek | 7400 | 3/26 | 37 | 10.0 | | | |
| +7E36 | Cloud's Peak | 10000 | 4/5 | 57 | 17.0E | | | |
| #7E28 | Muddy Creek G.S. | 7800 | 4/1 | 15 | 2.4 | 4.8 | 4.5** | 4 |
| #7E8 | Munkres Pass | 9700 | 4/1 | 32 | 8.3 | 10.4 | 9.3**e | 9 |
| #7E27 | Onion Gulch | 8100 | 3/25 | 31 | 8.3 | 10.3 | 9.2** | 4 |
| 8E5 | Soldier Park | 8700 | 3/31 | 20 | 5.6 | 8.6 | 5.8** | 8 |
| 7E6 | Sour Dough | 8500 | 3/31 | 24 | 4.7 | 8.1 | 7.3 | 23 |

** Average of all past data.
# Adjacent drainage; + Aerial stadia marker.
e Partial estimate during the 1943-57 base period; E Estimated Water Content.

## Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region I, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Fish & Wildlife Service
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Montana State Highway Dept.
East Glacier, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State School of Forestry
Montana State University
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch
Dept. of Lands & Forests
Victoria, British Columbia

Department of Northern Affairs
& National Resources
Calgary, Alberta

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COOPERATIVE SNOW SURVEYS

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